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FOSTERING QUALITY SCIENCE AT EPA: THE NEED FOR COMMON SENSE REFORM

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

THURSDAY, NOVEMBER 17, 2011

Serial No. 112–52

Printed for the use of the Committee on Science, Space, and Technology

Available via the World Wide Web: http://science.house.gov

U.S. GOVERNMENT PRINTING OFFICE

72–166PDF WASHINGTON : 2011

For sale by the Superintendent of Documents, U.S. Government Printing Office
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FOSTERING QUALITY SCIENCE AT EPA: THE NEED FOR COMMON SENSE REFORM

THURSDAY, NOVEMBER 17, 2011

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 2:52 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Andy Harris [Chairman of the Subcommittee] presiding.

RALPH M. HALL, TEXAS
CHAIRMAN

EDDIE BERNICE JOHNSON, TEXAS
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES
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Subcommittee on Energy & Environment

Fostering Quality Science at EPA: The Need for Common Sense Reform

Thursday, November 17, 2011
2:00 p.m. to 4:00 p.m.
2318 Rayburn House Office Building

Witnesses

Dr. Paul Anastas, Assistant Administrator, Office of Research and Development, U.S. Environmental Protection Agency

Mr. Arthur Elkins, Jr., Inspector General, U.S. Environmental Protection Agency

Mr. David Trimble, Director, Natural Resources and Environment, U.S. Government Accountability Office

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES

HEARING CHARTER

Fostering Quality Science at EPA: The Need for Common Sense Reform

Thursday, November 17, 2011
2:00 p.m. to 4:00 p.m.
2318 Rayburn House Office Building

PURPOSE

On Thursday, November 17, 2011, the Subcommittee on Energy and Environment of the Committee on Science, Space, and Technology will hold a hearing to review research and development activities at the Environmental Protection Agency (EPA) and how such activities support EPA program needs; explore the transition of science from the Office of Research and Development (ORD) to other program offices for use in developing and implementing regulations; examine the Science Advisory Board (SAB) process and how it contributes to the quality of science developed at ORD; and discuss any needed changes to the Environmental Research, Development and Demonstration Act which authorizes science activities at EPA.

WITNESSES

Dr. Paul Anastas, Assistant Administrator, Office of Research and Development, U.S. Environmental Protection Agency

Mr. Arthur Elkins, Jr., Inspector General, U.S. Environmental Protection Agency

Mr. David Trimble, Director, Natural Resources and Environment, U.S. Government Accountability Office

BACKGROUND

The Environmental Research, Development, and Demonstration Authorization Act (ERDDA) authorizes research and scientific activities at the Environmental Protection Agency (EPA). Originally enacted in 1976, Congress subsequently passed annual authorizations through fiscal year 1981. In addition to establishing annual authorization levels, these statutes also directed EPA policy in a variety of areas, including establishing the Office of Research and Development (ORD)[1], requiring a 5-year environmental R&D plan, and creating EPA's Science Advisory Board (SAB).

[1] See Appendix 1 for EPA organizational structure.

Year	Act	Public Law Number
1976	ERDDA	94-475
1977	ERDDA of 1978	95-155
1978	ERDDA of 1979	95-477
1979	ERDDA of 1980	96-229
1980	ERDDA of 1981	96-569

Since 1981, there have been a number of bills introduced to reauthorize ERDDA that were not ultimately enacted into law.[2] As a result, explicit authorization of EPA's environmental R&D ended at the end of fiscal year 1981. This failure to comprehensively reauthorize EPA programs and activities illustrates a broader trend among expired environmental statutes. The Congressional Research Service notes this trend, stating "Although Congress somewhat recently has renewed the authorization of appropriations for certain EPA programs and activities through targeted amendments to various statutes, a more comprehensive reauthorization of many of the statutes that EPA administers has not been enacted for a number of years."[3]

In addition to ERDDA, EPA also derives authority for R&D activities through other major environmental statutes. For example, under the Clean Air Act, the EPA Administrator must issue air quality criteria that "shall accurately reflect the latest scientific knowledge useful in indicating the kind of extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air."[4] Through the Safe Drinking Water Act (SDWA), EPA sets standards based on "the best available, peer-reviewed science and supporting studies conducted in accordance with sound and objective scientific practices."[5] Similarly, the Clean Water Act (CWA) requires EPA to publish water quality information "accurately reflecting the latest scientific knowledge."[6]

In many cases, these major regulatory statutes also authorize specific R&D programs and activities. For example, the Clear Air Act established a national research and development program for the prevention and control of air pollution including establishing technical advisory committees and research on air pollutant monitoring. The SDWA authorized the Administrator of EPA to conduct research and studies relating to the causes, diagnosis, treatment, control, and prevention of physical or mental diseases resulting directly or indirectly from contaminants in the water including improved methods to identify and measure contaminants in drinking water and improved methods to identify and measure the health effects of contaminants in drinking water. The CWA directed the Administrator to establish national programs for the prevention, reduction, and elimination of pollution and as part of such programs to work in cooperation with other State and Federal agencies to coordinate and accelerate research,

[2] HR 3115 (1982), HR 2804 (1982), S. 1205 (1982), S. 2577 (1983), HR 2899 (1984), S. 1292 (1984), HR 2319 (1985), S. 2702 (1985), S. 1144 (1986), HR 2355 (1987), HR 1523 (1987), HR 2153 (1989), HR 4873 (1990), HR 2404 (1991), S. 1655 (1991), HR 1994 (1993), S. 1545 (1993), HR 2405 (1995), HR 1814 (1995), HR 3322 (1996), HR 1276 (1997), HR 1742 (1999), HR 1743 (1999).
[3] Congressional Research Service, "Environmental Laws: Summaries of Major Statutes Administered by the Environmental Protection Agency," RL30798, August 11, 2011
[4] 42 U.S.C. §7408 (a)(2) (2000).
[5] 42 U.S.C. §300g-1(b)(3)(A)(i).
[6] 33 U.S.C. §1314 (a)(1).

investigation, experiments, demonstrations and studies relating to the causes, effects, extent, prevention, reduction and elimination of pollution in the navigable waters of the U.S.

The science enterprise at EPA is spread across program offices and regions. ORD is organized into three national labs (comprised of 18 separate labs) and four national centers (which have 19 divisions).[7] In addition to 18 labs within ORD, there are 9 labs split among several program offices and each of the 10 regions has its own lab.[8] In FY2010, the appropriations level for EPA Science and Technology activities (S&T includes ORD and the other 19 labs) was $750 million. The appropriations level for FY2011 was $650 million. The FY2012 House Committee-passed appropriations level is $755 million and the FY2012 Senate Committee draft appropriations level is $809 million.

The fragmented nature of EPA R&D presents a challenge to program management and coordination, and has complicated efforts to evaluate the effectiveness of these activities. Numerous studies conducted by the EPA Office of Inspector General (OIG), the Government Accountability Office (GAO), the National Academies of Science (NAS) and other outside groups over the years have cited significant concerns with the science activities of the Agency and the difficulties in evaluating the usefulness of the science to program needs.

ISSUES

Science Quality

The FY2012 Annual Plan of the EPA's OIG raises significant concerns about science and technology activities at the Agency, stating that "[q]uestions exist as to whether EPA is collecting the right data, of sufficient quality, and is making that data available."[9] In terms of EPA's regulatory process, the Inspector General (IG) further states that "[m]any policies are out of date or are based on outdated science and technology."[10] As part of the update on its High-Risk Program, GAO highlighted concerns about EPA politicization of science, saying that "[i]n recent years, concerns have been raised regarding the perceived politicization of science in agency decisions."[11] In 2009, GAO added EPA's handling of toxic chemicals through the Integrated Risk Information System (IRIS) to its list of areas at high risk for waste, fraud, abuse, and mismanagement.[12] Similarly, the chair of a 2009 National Academy of Sciences panel on ways to improve the Agency's risk assessment told the EPA's Science Advisory Board (SAB) and Board of Scientific Counselors (BOSC) earlier this year that the risk assessment process was the Agency's "Achilles heel."[13]

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[7] See Appendix 2.
[8] See Appendix 3.
[9] EPA Inspector General (IG), "FY 2012 Annual Plan," November 2011, http://www.epa.gov/oig/reports/2012/EPA_OIG_FY2012_AnnualPlan.pdf.
[10] Ibid.
[11] GAO, "Ensuring Sound Science," February 28, 2011, http://www.gao.gov/highrisk/agency/epa/ensuring-sound-science.php.
[12] GAO, "HIGH-RISK SERIES: An Update," January 2009, GAO-09-271, http://www.gao.gov/new.items/d09271.pdf. See also: David Trimble, "EPA HEALTH RISK ASSESSMENTS: Sustained Management and Oversight Key to Overcoming Challenges," Testimony before the Subcommittee on Investigations and Oversight, Committee on Science, Space, and Technology, U.S. House of Representatives, July 14, 2011, http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/071411_Trimble.pdf.
[13] *Inside EPA*, "Key Adviser Warns EPA to Improve Agency Science Or Face A 'Crisis'," July 6, 2011.

Peer Review

EPA IG's recently-released "Procedural Review of EPA's Greenhouse Gases Endangerment Finding Data Quality Processes" raised a number of concerns about how the Agency classifies scientific assessments and information, as well as the quality of peer review that EPA science undergoes. In reviewing EPA's Technical Support Document (TSD) in support of the Endangerment Finding, the IG found that:

> "EPA's peer review did not meet all OMB [Office of Management and Budget] requirements for such documents. EPA had the TSD reviewed by a panel of 12 federal climate change scientists. However, the panel's findings and EPA's disposition of the findings were not made available to the public as would be required for reviews of highly influential scientific assessments. Also, this panel did not fully meet the independence requirements for reviews of highly influential scientific assessments because one of the panelists was an EPA employee. Further, in developing its endangerment finding, we found that OAR [Office of Air and Radiation] did not: Include language in its proposed action, final action, or internal memoranda that identified whether the Agency used influential scientific information or highly influential scientific assessments to support the action. OAR also did not certify that the supporting technical inform."[14]

Advisory Panels

Several concerns have been raised about the make-up, transparency, and rigor provided by EPA advisory panels like the SAB and the Clean Air Scientific Advisory Committee (CASAC). Despite the requirement under the Federal Advisory Committee Act that panels be "fairly balanced in terms of points of view presented and the functions to be performed by the advisory committee,"[15] GAO has found that "[m]any advisory committee members are not appropriately screened for potential conflicts of interest or points of view."[16] Similarly, EPA IG has also cited avenues for improving the Agency's process for establishing peer review panels. In a 2009 review of the National Center for Environmental Assessment's process, EPA IG found that the Center "does not have procedures for addressing conflicts of interest or potential biases," lacked "adequate controls to establish accountability for suitability determinations and rationale for including or excluding each panelist," and did not have a useful interpretation of impartiality in selecting peer review panels.[17] Testimony from a recent participant in CASAC's particulate matter National Ambient Air Quality Standard panel stated that the CASAC process is "flawed, narrow, and possibly ethically questionable."[18]

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[14] EPA IG, "Procedural Review of EPA's Greenhouse Gases Endangerment Finding Data Quality Processes," Report No. 11-P-0702, September 26, 2011, http://www.epa.gov/oig/reports/2011/20110926-11-P-0702.pdf.

[15] 5 U.S.C. App

[16] GAO, "Ensuring Sound Science." See also: John Stephenson, GAO, Testimony before the Committee on Environment and Public Works, U.S. Senate, "SCIENTIFIC INTEGRITY: EPA's Efforts to Enhance the Credibility and Transparency of Its Scientific Processes," June 9, 2009, http://www.gao.gov/products/GAO-09-773T.

[17] EPA IG, "EPA Can Improve Its Process for Establishing Peer Review Panels," April 29, 2009, Report No. 09-P-0147, http://www.epa.gov/oig/reports/2009/20090429-09-P-0147.pdf.

[18] Robert F. Phalen, University of California, Irvine, Testimony before the Subcommittee on Energy and Environment, House Committee on Science, Space, and Technology, October 4, 2011, http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/100411_Phalen.pdf.

Prioritization

In order for EPA science to better match the agency's environmental goals and the individual regulatory needs of program offices, both GAO and the EPA IG have recommended important reforms. GAO found that "EPA needs to better emphasize the development and use of environmental indicators and information…as a mechanism for prioritizing its allocation of limited resources,"[19] and that the "[l]ack of complete and comprehensive environmental information on air or water quality, for example, makes it difficult for EPA to evaluate the success of its policies and programs."[20] EPA IG has also found that, despite the fact that the top goal in the Agency's strategic vision includes "Taking Action on Climate Change,"[21] EPA "does not have an overall plan to ensure developing consistent, compatible climate change strategies across the Agency" which could "result in duplication, inconsistent approaches, and wasted resources among EPA's regions and offices."[22]

Scientific Integrity

Finding that significant numbers of ORD staff were unaware of the Agency's policies earlier this year, the EPA IG recommended that "ORD should improve how it evaluates the effectiveness of its policies and procedures for scientific integrity and research misconduct."[23] Concerns have also been raised about the lack of detail in EPA's draft scientific integrity policy. [24]

Management of Laboratory and Science Activities

In a July 2011 report requested by Ranking Member Miller, GAO found that EPA's laboratory activities "remain fragmented and largely uncoordinated," and that "EPA has not undertaken an agency wide, coordinated approach to managing its scientific efforts and related facilities as part of an interrelated portfolio of facilities." This report also found that the Agency had failed to implement the recommendations of five independent evaluations of EPA's scientific and laboratory management since 1992.[25]

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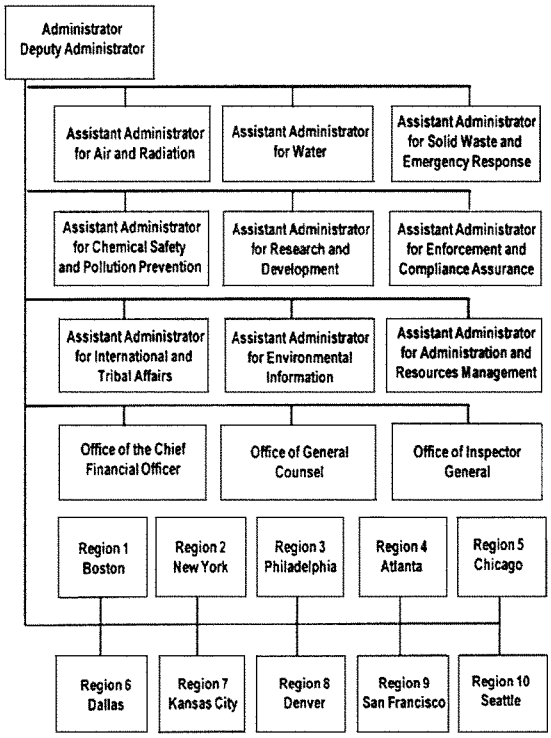
[19] GAO, "Improving the Development and Use of Environmental Information," November 12, 2009, http://www.gao.gov/highrisk/agency/epa/improving-the-development-and-use-of-environmental-information.php.
[20] GAO, "Environmental Protection Agency," November 6, 2009, http://www.gao.gov/highrisk/agency/epa/.
[21] http://www.epa.gov/planandbudget/strategicplan.html.
[22] EPA IG, "EPA Needs a Comprehensive Research Plan and Policies to Fulfill its Emerging Climate Change Role," February 2, 2009, Report No. 09-P-0089, http://www.epa.gov/oig/reports/2009/20090202-09-P-0089.pdf.
[23] EPA IG, "Office of Research and Development Should Increase Awareness of Scientific Integrity Policies," July 22, 2011, Report No. 11-P-0386, http://www.epa.gov/oig/reports/2011/20110722-11-P-0386.pdf.
[24] Emily Yehle, "EPA's Scientific Integrity Policy Draft Skimpy on Specifics, Critics Charge," *Greenwire*, August 8, 2011, http://www.nytimes.com/gwire/2011/08/08/08greenwire-epas-scientific-integrity-policy-draft-skimpy-o-5210.html.
[25] GAO, "ENVIRONMENTAL PROTECTION AGENCY: To Better Fulfill Its Mission, EPA Needs a More Coordinated Approach to Managing Its Laboratories," July 2011, GAO-11-347, http://www.gao.gov/new.items/d11347.pdf.

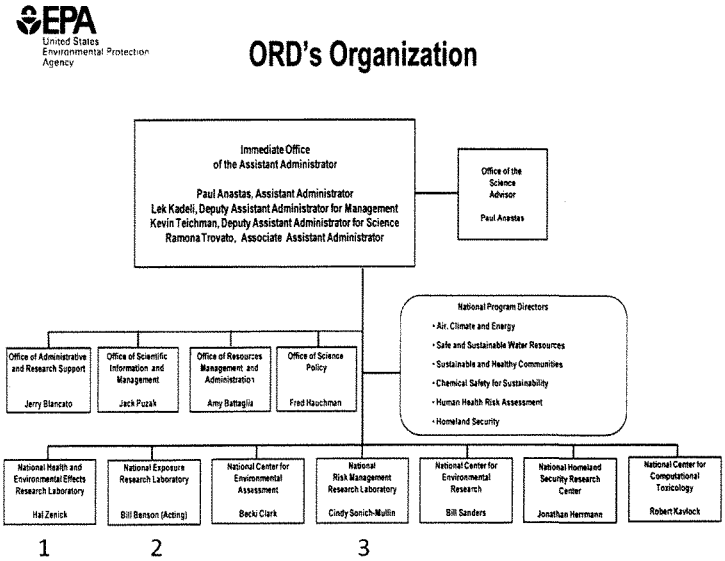
Appendix 1

EPA
United States Environmental Protection Agency

U.S. EPA Organizational Chart

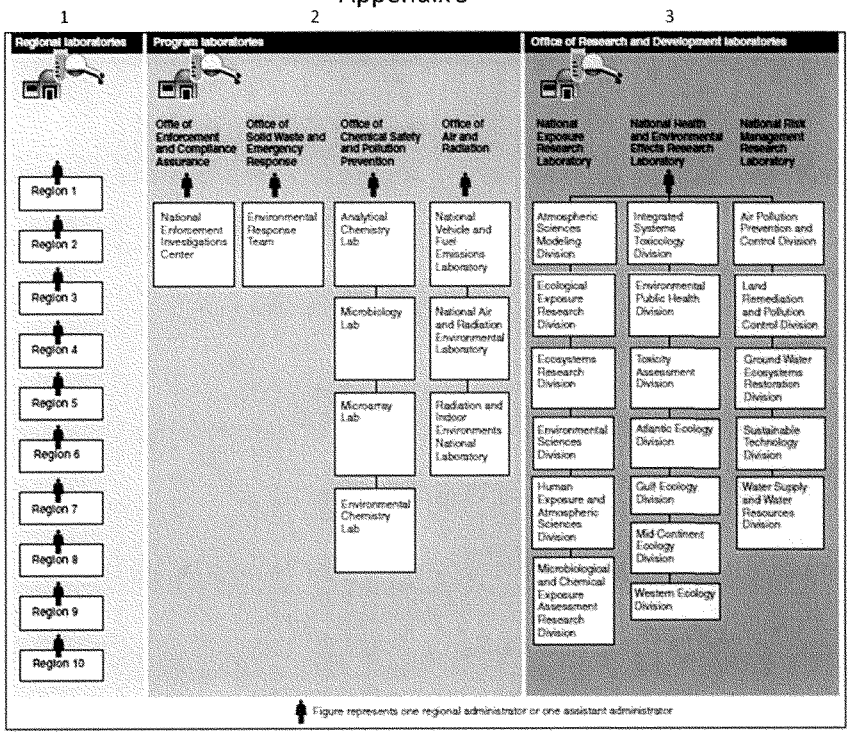


Appendix 2



The bottom of this chart shows three national labs and four national centers. The three national labs are broken down in Appendix 3.

Appendix 3



Source: GAO.

Column 1 shows 10 regional labs. Column 2 shows 9 program labs. Column 3 shows 18 ORD labs.

Chairman HARRIS. The Subcommittee on Energy and Environment will come to order. Good afternoon. Welcome to today's hearing entitled, "Fostering Quality Science at EPA: The Need for Common Sense Reform." In front of you are packets containing the written testimony, biographies, and truth in testimony disclosures for today's witness panel.

I now recognize myself for five minutes for an opening statement.

First of all, I want to thank you for your patience as we went through our first series of votes, and I want to welcome everyone to this afternoon's hearing on "Fostering Quality Science at EPA." I would like to note my appreciation at the outset to Dr. Anastas for moving his schedule around in order to be with us today, but you know, I was a little disappointed that we didn't get your testimony until late last night, so I haven't had the chance to review it, but I look forward to hearing it in person. I trust that you will make sure to try to meet the committee deadlines, a little more leeway time there, in the future.

In the last 9 months this committee has held seven different hearings on issues related to EPA science and process. In each of these hearings we have questioned the processes by which the agency ensures the development and dissemination of quality science and raised concerns about EPA moving forward on specific regulations before the science is available to inform those decisions. In today's hearing we are discussing the overall science enterprise and its function within EPA.

Research and development at EPA have been authorized by a number of environmental laws, but the Environmental Research Development and Demonstration Authorization Act or ERDDA is the only statute dedicated solely to science activities in the agency. This law, first enacted in 1976, was reauthorized annually through fiscal year 1981, providing authorization levels to address different environmental issues.

Additionally, ERDDA established the Office of Research and Development, required five-year R&D plans, and created EPA Science Advisory Board. However, despite numerous efforts in both the House and Senate, no reauthorization has occurred in 30 years.

EPA is a unique agency in that it performs the functions of the scientists, the policymaker, the regulator, and the enforcer. Since it has been 40 years since the creation of the agency and 30 years since science activities were last authorized, it is both appropriate and necessary for Congress to evaluate the effectiveness of the EPA in fulfilling all of those roles.

In the current economic climate and given the EPA's breadth of jurisdiction over the economy, the agency must be vigilant in ensuring that it only promulgates regulations that are necessary and appropriate to protect public health and welfare. Quality science is an essential requirement in creating these regulations, yet time and again EPA's scientific justification for many of its rules and regulations have been questioned based on concerns with data quality, peer review, lack of transparency, and other process problems.

It has gotten to the point where the perception is that EPA may have a pension for pursuing outcome-based science in order to validate its regulatory agenda. This has led to a crisis of confidence

that undermines the ability of the public to trust what EPA says, an untenable situation for an agency with sweeping authority over the Nation's economic activity.

So what can be done to fix this dilemma? Is it a question of greater oversight, or are there fundamental changes within the organization of EPA that are needed to address these problems? There have been reports, evaluations, and studies over the years that have identified the specific problems within the EPA science enterprise.

Consequently, these reports have contained recommendations to the agency on how to alleviate these problems. Unfortunately, many of these recommendations have not been followed and all too often Congress has been absent from these reform efforts.

As this committee undertakes the process to reauthorize ERDDA, I invite any interested stakeholders to provide recommendations and suggestions. Similarly, I welcome the suggestions of my colleagues across the aisle and hope that they will view this as an opportunity to collaborate on much-needed reforms.

Science activities at EPA comprise only a fraction of the agency's overall budget, but their importance and impact on jobs in the economy are enormous. Good regulations must be based on good science, and good science requires transparency, quality data, and confirmation of processes and results through peer review.

In other words, it requires an adherence to the scientific method and longstanding principles governing the incorporation and use of scientific and technical information to regulatory decision making.

Again, I want to thank the witnesses for appearing before the Subcommittee today. Again, I apologize for the delay, and I look forward to a constructive discussion.

I yield back my time.

[The prepared statement of Mr. Harris follows:]

PREPARED STATEMENT OF CHAIRMAN ANDY HARRIS

I want to welcome everyone to this afternoon's hearing on Fostering Quality Science at EPA: The Need for Common Sense Reform. I would like to note my appreciation at the outset to Dr. Anastas for moving his schedule around in order to be with us today, however, I am disappointed that you did not get your testimony to us until 6:00 pm last night. I trust that you make sure to meet Committee deadlines in the future.

In the last nine months, this Committee has held seven different hearings on issues related to EPA science and process. In each of these hearings, we have questioned the processes by which the Agency ensures the development and dissemination of quality science and raised concerns about EPA moving forward on specific regulations before the science is available to inform those decisions. In today's hearing, we are discussing the overall science enterprise and its function within EPA.

Research and development in EPA have been authorized by a number of environmental laws, but the Environmental Research, Development and Demonstration Authorization Act, or ERDDAA (ERDDA) is the only statute dedicated solely to science activities in the agency. This law, first enacted in 1976, was reauthorized annually through fiscal year 1981 providing authorization levels to address different environmental issues. Additionally, ERDDAA established the Office of Research and Development, required 5-year R&D plans and created EPA's Science Advisory Board. However, despite numerous efforts in both the House and Senate, no reauthorization has occurred in 30 years.

EPA is a unique agency in that it performs the functions of the scientist, the policy maker, the regulator, and the enforcer. Since it has been forty years since the creation of the agency, and thirty years since science activities were last authorized, it is appropriate and necessary for Congress to evaluate the effectiveness of the EPA in fulfilling all these roles.

In the current economic climate and given the EPA's breadth of jurisdiction over the economy, the Agency must be vigilant ensuring that it only promulgates regulations that are necessary and appropriate to protect public health and welfare. Quality science is an essential requirement in creating these regulations. Yet time and again, EPA's scientific justification for many of its rules and regulations have been questioned based on concerns with data quality, peer review, lack of transparency and other process problems. It has gotten to the point where the perception is that EPA has a penchant for pursuing outcome-based science in order to validate its regulatory agenda. This has led to a crisis of confidence that undermines the ability of the public to trust anything EPA says, an untenable situation for an Agency with sweeping authority over the nation's economic activity.

So what can be done to fix this dilemma? Is it a question of greater oversight? Or are there fundamental changes within the organization of EPA that are needed to address these problems? There have been reports, evaluations, and studies over the years that have identified the specific problems within the EPA science enterprise. Consequently, these reports have contained recommendations to the Agency on how to alleviate these problems. Unfortunately, many of these recommendations have not been followed, and all too often Congress has been absent from these reform efforts.

As this Committee undertakes the process to reauthorize ERDDAA, I invite any interested stakeholders to provide recommendations and suggestions. Similarly, I welcome the suggestions of my colleagues across the aisle and hope that they will view this as an opportunity to collaborate on much needed reforms.

Science activities at EPA comprise only a fraction of the agency's overall budget, but their importance and impact on jobs and the economy are enormous. Good regulations must be based on good science, and good science requires transparency, quality data, and confirmation of processes and results through peer review. In other words, it requires an adherence to the scientific method and longstanding principles governing the incorporation and use of scientific and technical information to regulatory decision-making.

I want to thanks the witnesses for appearing before the Subcommittee today and I look forward to a constructive discussion.

Chairman HARRIS. I now want to recognize Mr. Tonko for five minutes for an opening statement.

Mr. TONKO. Thank you, Mr. Chair. Ranking Member Miller wanted to be here at the start of this hearing but had a scheduling conflict and will join us later. I want to thank Chairman Harris for holding a hearing to examine the ability of EPA's research enterprise to meet the agency's mission to protect public health and the environment.

Scientific research, knowledge, and technical information are fundamental to EPA's mission and inform its standard setting, regulatory, compliance, and enforcement functions. The agency's scientific performance is particularly important as complex environmental issues emerge and evolve, and it is science, not partisan politics, which should guide their resolution.

Unfortunately, controversy continues to surround many of the agency's areas of responsibility. Let me be clear. There may be some legitimate concerns related to EPA's research enterprise, but EPA is not the demonic agency that our Republican majority has made it out to be this Congress. This hearing is the beginning of a real opportunity to become informed about structural and substantive concerns related to EPA's research activities. I hope that my Republican counterparts are really interested in reform that will lead to better research to enhance public health and protect our environment.

I do not believe anyone would disagree that we should always adhere to best practices, transparency, and indeed, integrity in all of our work. That is why in 2008, the Ranking Member of this Subcommittee, Mr. Miller, requested that GAO take a look at the inde-

pendent evaluations that have been done over the past 20 years and that identified problems with EPA's 35 laboratories' operations and management.

In an atmosphere of constrained budgets it is imperative that with EPA's increasing need to understand complex environmental problems, they are positioned to formulate sound environmental protection policies. These independent evaluations have called for improved planning, coordination, and leadership, as well as consolidation of laboratories. The EPA operates some 35 laboratories to provide the scientific foundation for its mission. When it was established in 1970, EPA inherited 42 laboratories from programs in various federal departments. EPA has since closed or consolidated some laboratories and created new ones to support its core mission.

Of course, closing facilities always has an impact on the surrounding community. That impact could, perhaps, be amplified given the current state of the economy, and we must be mindful of such outcomes. Despite this, it is still our responsibility to explore all options for productive and effective cost savings.

Independent evaluations of the GAO have highlighted the need for the EPA to develop a coordinated planning process for its scientific activities and improve agency-wide research planning, among many other suggestions. It is important to note that these issues are not new under the current Administration. They span the activities and inactivity of several Administrations. Don't be fooled by the rhetoric on the right that the Obama Administration was the impetus of the concerns expressed here. These concerns did not appear overnight or in just the past three years. They will need to be corrected over time, and any reorganization will need to be done in an orderly, well thought out manner with much oversight and input.

In recent years, the IG has put forward many recommendations to improve the ORD that appear to have been embraced by the agency. Overall, the IG has found that the EPA ORD peer review process adequately produces objective scientific reviews. As we have said time and time again in this committee, good policy and decisions begin with good science. I am sure there is room for improvements, and I hope we can work together to identify opportunities to make EPA more effective in protecting our—the public and our environment.

Today we are presented with the perfect opportunity to show American taxpayers that not every issue needs to be polarizing or politicized. It is an opportunity for Congress to be productive and objective. It is also an opportunity to put our differences aside and have meaningful conversations and exchanges of ideas. We need to build upon EPA's scientific legacy and ensure that we continue to improve our shared environment, including for future generations.

Chairman Harris, we look forward to working with you in the months ahead. With that I conclude my opening remarks but would ask, Mr. Chair, that before I yield back, I do have one further point of business if you will allow me to continue.

[The prepared statement of Mr. Tonko follows:]

PREPARED STATEMENT OF REPRESENTATIVE PAUL TONKO

Mr. Miller wanted to be here at the start of this hearing but had a scheduling conflict, and will join us later. I want to thank Chairman Harris for holding a hearing to examine the ability of EPA's research enterprise to meet the agency's mission to protect public health and the environment. Scientific research, knowledge, and technical information are fundamental to EPA's mission and inform its standard-setting, regulatory, compliance, and enforcement functions. The agency's scientific performance is particularly important as complex environmental issues emerge and evolve. And it is science, not partisan politics, which should guide their resolution. Unfortunately, controversy continues to surround many of the agency's areas of responsibility. Let me be clear, there may be some legitimate concerns related to EPA's research enterprise, but EPA is not the demonic agency that the Republican Majority has made it out to be this Congress.

This hearing is the beginning of a real opportunity to become informed about structural and substantive concerns related to EPA's research activities. I hope that my Republican counterparts are really interested in reform that will lead to better research to enhance public health and protect the environment.

I do not believe anyone would disagree that we should always adhere to best practices, transparency, and integrity in all of our work. That is why in 2008, the Ranking Member of this Subcommittee, Mr. Miller, requested the GAO to take a look at the independent evaluations that have been done over the past 20 years and that identified problems with the EPA's 35 laboratories' operations and management. In an atmosphere of constrained budgets, it is imperative that, with EPA's increasing need to understand complex environmental problems,they are positioned to formulate sound environmental protection policies.

These independent evaluations have called for improved planning, coordination, and leadership, as well as consolidation of laboratories. The EPA operates 35 laboratories to provide the scientific foundation for its mission. When it was established in 1970, EPA inherited 42 laboratories from programs in various federal departments. EPA has since closed or consolidated some laboratories and created new ones to support its core mission. Of course, closing facilities always has an impact on the surrounding community. That impact could perhaps be amplified given the current state of the economy and we must be mindful of such outcomes. Despite this, it is still our responsibility to explore all options for productive and effective cost-savings.

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Chairman Harris, we look forward to working with you in the months ahead. I yield back.

Chairman HARRIS. Without objection.

Mr. TONKO. Mr. Chair, I want to ensure that we include into the record the written testimony of Dr. Granger Morgan, the former chair of the EPA Science Advisory Board. He included with his testimony a letter expressing his frustration with the surrounding events of our committee's request for him to testify, and he states, and I would read the first two paragraphs of his letter that are ad-

dressed to you, Andy Harris M.D., as Chair, and Representative Brad Miller of North Carolina as ranking member of the Subcommittee on Energy and Environment.

"Dear Congressman Harris and Miller, several days ago I was contacted by committee staff about the possibility of testifying to the hearing you are holding tomorrow afternoon on the EPA Science Advisory Board. Because I had academic conflicts I was not able to attend the hearing. Last evening your staff indicated that arrangements could be made for me to testify over a video link if I could get my testimony prepared and submitted by midday today. Accordingly, I dropped everything and prepared the testimony that follows. I have just now been informed that my testimony is no longer desired.

I understand that such things happen, however, having already spent the time to write my remarks, I thought you and some other Members might find it of some use to see what I had prepared."

Chairman Harris, these are difficult words to read. Here in Congress we call on some of the world's best experts to come and testify. These are busy people who sacrifice their time and their resources as a service to our country. I hope this type of situation does not occur again and that under your leadership we can improve the committee's relationship with potential witnesses going forward.

Mr. Chair, I ask for unanimous consent to enter this testimony into the record.

Chairman HARRIS. Thank you very much. Let me just ask for a clarification. You want to submit the letter into the record. Is that right? So not his testimony?

Mr. TONKO. It is included altogether I am told. His testimony and his letter.

Chairman HARRIS. Well, I mean, my concern is that, you know, with testimony we would get to actually question people who actually submit testimony. So it is just a minor clarification. I mean, I am perfectly willing to submit his letter, a letter with an attachment into the record, but I don't think we can really call it testimony.

Mr. TONKO. Yeah.

Chairman HARRIS. Okay.

Mr. TONKO. We will abide by that and provide——

Chairman HARRIS. Okay.

Mr. TONKO. —what we have here on behalf of the witness who had hoped he could present, Mr. Morgan.

Chairman HARRIS. Thank you very much, Mr. Tonko, and we will absolutely. I mean, we do want—we recognize that the people we ask to appear in front of this committee are very busy and sometimes difficult to arrange a schedule, and you know, even with the delay today, I mean, sometimes we have to juggle even within that schedule, but, yes, it is my desire to do that, to make it easy for someone to come and share their experience with the American public in a Congressional hearing.

Mr. TONKO. Mr. Chairman, I thank you, and with that I yield back my time.

Chairman HARRIS. Thank you very much.

If there are Members who wish to submit additional opening statements, your statements will be added to the record at this point.

At this time I would like to introduce our witness panel. Our first witness today is Dr. Paul Anastas, well known to the Committee and Subcommittee, the Assistant Administrator of the Office of Research and Development at EPA. The next witness will be Mr. David Trimble, Director of Natural Resources and Environment at the U.S. General Accounting Office, and I guess the way you are sitting here, the other witness is Mr. Arthur Elkins, Inspector General of the U.S. Environmental Protection Agency.

Thank you all for appearing before the Subcommittee today. Now, we were notified that we may actually in another half hour or so go back for one more vote or possibly two more votes, so we are going to go through the testimony. We are going to start questioning, and we will see where that ends up.

As our witnesses should know, spoken testimony is limited to five minutes each, after which Members of the Committee will have five minutes each to ask questions.

I now recognize our first witness, Dr. Paul Anastas, Assistant Administrator of the Office of Research and Development at the EPA. Dr. Anastas.

STATEMENTS OF DR. PAUL ANASTAS, ASSISTANT ADMINISTRATOR, OFFICE OF RESEARCH AND DEVELOPMENT, U.S. ENVIRONMENTAL PROTECTION AGENCY

Dr. ANASTAS. Good afternoon, Chairman Harris, Congressman Tonko, and distinguished Members of the Committee. I am Paul Anastas. I am the Assistant Administrator for the Office of Research and Development at the U.S. Environmental Protection Agency, and I want to thank you for the opportunity to speak with you today about EPA's research programs.

Scientific research is vital to pursuing EPA's mission of protecting human health and the environment. As EPA Administrator Lisa Jackson has said time and again, science is the backbone of EPA. All of the agency's decisions and actions are grounded in sound and rigorous science. That is what the American people expect and deserve.

Every day the scientists and engineers in the EPA's Office of Research and Development demonstrate excellence and dedication in their scientific work. I could not be more proud of my colleagues or more confident in their abilities.

But we all recognize that in science there is no room for arrogance. That is why we work closely with our Science Advisory Board to obtain independent, external peer review of our research plans and with our Board of Scientific Counselors to obtain peer review of our research products. At every step along way we seek input from the scientific community and the public. We welcome their comments, and we address them.

This process, which can include public comment periods, open peer review sessions, and public meetings, is one of the most rigorous and transparent peer review processes anywhere. We firmly believe that when it comes to science, transparency is the most

powerful way to ensure integrity. The agency depends on its Office of Research and Development to provide the scientific tools, assessments, and technologies to inform decision making.

For this reason in addition to being sound and transparent, EPA's research must also be highly effective and responsive. Over the past year EPA has engaged in a major effort to strength its research program with two primary goals. First, to ensure that our research most effectively meets the needs of those who use and depend upon it, including EPA's program and regional offices. Second, to ensure the cohesiveness of research across the Office of Research and Development, including the development of collaborative research plans that cut across multiple disciplines and multiple laboratories.

With these goals in mind EPA research programs were aligned into four crosscutting areas. One, air climate and energy, two, safe and sustainable water resources, three, sustainable and healthy communities, and four, chemical safety for sustainability.

In addition, EPA is continuing to fulfill its scientific responsibilities in two targeted research areas; homeland security and human health assessment. Realigning our research has made EPA's scientific enterprise more effective by design. We have new opportunities to coordinate scientific expertise, capabilities, and resources that were previously managed separately.

We have built engagement with EPA's program and regional offices into every stage of the research process to ensure that their needs are met in a timely and responsive manner. We have broken down the traditional boundaries between scientific disciplines so that our scientists can more effectively address crosscutting real world challenges.

In their 2011 joint report EPA Science Advisory Board and Board of Scientific Counselors stated that they "strongly support ORD's consolidation and realignment of research programs."

Science and technology in EPA is not limited to the agency's Office of Research and Development. A network of laboratories spans across ORD, program offices, and regional laboratory organizations, each with different objectives toward the pursuit of EPA's mission.

To be clear, the Office of Research and Development laboratories conduct research and assessments that inform many of the agency's actions and decisions including protective standards and guidance. The program offices' office laboratories develop science that supports regulatory implementation, compliance, and enforcements at the national level. Regional laboratories provide technical information to support immediate regional needs and regional decision making.

The recent GAO report on EPA's laboratory network recommends that the EPA Administrator take several actions to improve the cohesion and management of the agency's laboratories. We take these recommendations very seriously, and I invite you to review EPA's response to each of these recommendations in my written testimony.

To conclude, EPA has a strong tradition of scientific excellence. In all of our research we are committed to strong science, continual improvement, and scientific openness on behalf of the American

people. Thank you for this opportunity to appear before you today, and I will be happy to take questions at the appropriate time.

[The prepared statement of Dr. Anastas follows:]

PREPARED STATEMENT OF DR. PAUL ANASTAS, ASSISTANT ADMINISTRATOR, OFFICE OF RESEARCH AND DEVELOPMENT, U.S. ENVIRONMENTAL PROTECTION AGENCY

Good morning Chairman Harris, Ranking Member Miller, and other distinguished Members of the Committee. My name is Paul Anastas. I am the Assistant Administrator for Research and Development at the U.S. Environmental Protection Agency (EPA).

The Office of Research and Development (ORD) is unique in the environmental science community because it conducts intramural and extramural research across the entire spectrum of disciplines necessary to support the mission of EPA. EPA works with many providers of scientific information to accomplish its mission, including international and domestic academic institutions, state and local agencies, industry, and other federal scientific agencies.

I appreciate the opportunity to talk with you today about our research programs. I understand that the Committee would like me to discuss a number of specific issues, but first I would like to talk about the bigger picture—where I believe EPA needs to be orienting our scientific efforts if it is going to provide the cutting edge knowledge and tools needed in the 21st century and to be competitive in the world.

Every day, EPA continues to transform the vision of a healthy economy and a healthy environment into reality for all Americans. It's a vision that starts with science. The Agency relies on ORD to produce scientifically sound research, methods, and tools to fulfill its legislative mandates and meet its mission to protect human health and the environment. EPA is a world leader in scientific research for human health and environmental protection. The environmental breakthroughs mentioned above could only be achieved through research and development including the that of EPA's scientific research. The cumulative benefits of this work, along with work in other sectors, have restored ecosystems, improved public health, and increased overall life expectancy in a time when our economy and population have continued to grow.

Further, in its 2011 report on Sustainability and the US EPA, the National Research Council of the National Academy of Sciences recognized that current approaches aimed at decreasing existing risks, however successful, are not capable of avoiding the complex problems in the US and globally that threaten the planet's critical natural resources and put current and future human generations at risk. In considering sustainability as a way of ensuring long-term human well-being, the report also states that the potential economic value of sustainability to the U.S. is recognized to not merely decrease environmental risks, but also to optimize the social and economic benefits of environmental protection.

ORD RESEARCH PROGRAMS

During the past year, EPA's research programs have been realigned to meet the emerging needs of EPA internal and external stakeholders while advancing the science needed for sustainability. As a starting point, ORD research programs are structured to address the EPA strategic goals in the EPA FY 2011–2015 Strategic Plan. ORD'S research program are focused on:

- Air, Climate, and Energy;
- Safe and Sustainable Water Resources;
- Sustainable and Healthy Communities; and
- Chemical Safety for Sustainability

In addition to above 4 programs, EPA has special responsibilities for two targeted research programs —homeland security and human health risk assessment, which integrates scientific information from EPA and other research to develop health assessments for environmental contaminants.

Organizing our research into these six areas provides ORD with opportunities to integrate and coordinate research among areas that were previously planned and managed separately. For example, the Chemical Safety for Sustainability program now integrates research on pesticides and toxics, endocrine disruptors, and computational toxicology. Similarly, the Safe and Sustainable Waters program brings together research on drinking water and surface water quality. Certain topics, such as climate change, nitrogen, and children's health, involve multiple scientific disciplines and, therefore, require integration across research programs.

Research is conducted by ORD scientists and engineers working in laboratories and research facilities at 14 locations around the country. They are joined by a network of collaborators and partners, including those supported through EPA's Science to Achieve Results (STAR) extramural research program. The STAR program provides competitive funding opportunities for research grants, graduate and undergraduate fellowships, and larger, largely multidisciplinary research centers. EPA is also one of 11 federal agencies that participate in the Small Business Innovative Research (SBIR) program, enacted in 1982 to strengthen the role of small businesses in federal research and development, create jobs, and promote technical innovation.

Engaging Others in ORD's Research Planning

We are very serious about ensuring that the research and development work in ORD is responsive to the needs of the Agency. Over the past year, through meetings with managers and staff in EPA's program and regional offices, webinars, "listening sessions" with the public, and other open platforms, Agency researchers have undertaken an unprecedented effort to engage EPA's partners and stakeholders inside and outside the government. The discussions sparked collaboration, innovation, and creativity from every corner of the EPA research community involved in designing needed research. ORD is committed to providing ongoing interactions to ensure that Agency program and regional offices, states, tribes, and other stakeholders receive the scientific information they need to make informed decisions and enforce the nation's environmental laws.

In addition to the steps taken to ensure involvement by the Program and Regional Offices in ORD's research planning process, ORD is committed to providing scientific expertise to the Program Offices as they develop regulations and policy. ORD research also provides the tools needed to evaluate management options for thousands of sites contaminated by past practices or current environmental releases. Further, the Science Advisory Board (SAB) provides expert advice on scientific and technical matters within the Agency. We formally request the SAB to review our research plans and proposed allocation of ORD resources each year and ORD values their input.

PEER REVIEW

The EPA takes its responsibility concerning peer review very seriously. For example, all of ORD's draft human health assessments are subjected to rigorous, open, independent, external peer review. The external peer reviewers typically convene at a public meeting to discuss their comments on our work. . We recognize the importance of independent, external peer review in maintaining high standards for the quality of the science and technical products that EPA produces and sponsors. Peer review is an important component of the scientific process that provides a focused, objective evaluation of a draft product. The constructive criticisms, suggestions, and new ideas provided by the peer reviewers stimulate creative thought, and strengthen and confer credibility on the product. Comprehensive, objective peer reviews lead to good science and product acceptance within the scientific community. Thus, peer review ensures that the Agency's scientific reports are held to the highest possible standards.

EPA makes every effort to assure that the scientists serving on these review panels do not have any actual or potential conflicts of interest, including an appearance of bias or lack of impartiality. This rigorous process is designed to assure that the Agency's peer reviews are independent, open, transparent, and of the highest scientific quality.

EPA LABORATORIES — RESPONSE TO THE GAO REPORT

Now I want to discuss EPA's network of laboratories and the Agency's response to the recent GAO report about EPA laboratories. I agree with the GAO observation that "EPA's scientific research, technical support, and analytical services underpin the policies and regulations the agency implements."[1] The connection between EPA's laboratory science and Agency decision-making illustrates the strategic importance of EPA's laboratory network. This network consists of 35 laboratories located in 29 cities nationwide.[2]

EPA's laboratory network is comprised of ORD, program office, and regional laboratory organizations. Each of these three laboratory organizations has different ob-

[1] Ibid., page 1.

[2] Letter from EPA Deputy Administrator Robert Perciasepe to David C. Trimble, Acting Director Natural Resources and the Environment, U.S. GAO, July 11, 2011.

jectives[3] with respect to EPA's mission-and a common need for coordination with Agency clients and partners:

- *ORD laboratories* have primary responsibility for research and development—developing knowledge, assessments, and scientific tools that form the underpinnings of the vast majority of EPA's protective standards and guidance.
- *Program Office laboratories* have primary responsibility for directly supporting regulatory implementation, compliance, and enforcement at a national level—e.g., motor vehicle standards testing, pesticide registration.
- *Regional laboratories* are responsible for providing scientific data and sampling results which support the Regional environmental programs' needs for immediate information to make decisions on environmental conditions, enforcement, and progress to achieve our nation's standards for environmental and human health.

While the scientific activities of EPA's research and program laboratories focus on long-term outcomes at a national level, EPA's regional laboratories are designed and organized to meet the near-term decision-needs of their Regions, State, and Tribal partners.

EPA has benefited from advice by the U.S. Government Accountability Office (GAO)-most recently, from the GAO study of EPA's laboratory network published in July 2011.

The report from GAO identifies a number of challenges to managing federal laboratories government-wide.[4] One major challenge is the increasing cost of maintaining the portfolio of aging federal laboratory facilities. A second major challenge is reducing the energy consumed by laboratory facilities.

These facilities consume more energy and emit more greenhouse gases per square foot of floor space than virtually any other type of facility-from five to ten times the amount of energy than office buildings with an equivalent footprint.[5] EPA recognizes that improving the energy and environmental "footprint" of federal laboratory facilities is important for our nation's strategy to achieve energy independence, improve the environment, and reduce consumption of natural resources.[6] In fact, Executive Order 13514 requires that each federal agency prepare a strategic sustainability plan to guide its efforts to 'green' its facilities to improve their effectiveness and efficiency.[7]

The GAO report on EPA's laboratory network recommends that the Administrator of EPA take seven actions to improve the cohesion and management of the Agency's laboratories. In general, EPA agrees with these GAO recommendations. EPA's Deputy Administrator Bob Perciasepe communicated EPA's response to the GAO recommendations in a July 2011 letter, which GAO included in its report.[8] Here are highlights of the seven GAO recommendations and EPA's responses:

1) Develop an overarching issue-based planning process that reflects the collective goals, objectives, and priorities of the laboratories' scientific activities.

EPA will consult with stakeholders to determine the best approach to develop an overarching planning process and system.

2) Establish a top-level science official with the authority and responsibility to coordinate, oversee, and make management decisions regarding major scientific activities throughout the agency, including the work of all program, regional, and research laboratories.

EPA will expand the authority and responsibility of the Agency's Science Advisor to coordinate, oversee, and make recommendations to the Administrator regarding major scientific activities throughout the agency, including the work of all program, regional, and ORD laboratories. EPA's Science and Technology Policy Council (STPC) will assist the Science Advisor with these new responsibilities. This Council

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[3] Letter from EPA Deputy Administrator Robert Perciasepe to David C. Trimble, Acting Director Natural Resources and the Environment, U.S. GAO, July 11, 2011.

[4] See the GAO High Risk Series on Federal Real Property, beginning with U.S. GAO-03-122, January 30, 2003.

[5] Letter from EPA Deputy Administrator Robert Perciasepe to David C. Trimble, Acting Director Natural Resources and the Environment, U.S. GAO, July 11, 2011, pages 1–2.

[6] *"Laboratories for the 21st Century: Program Overview."* U.S. Environmental Protection Agency and Federal Energy Management Program. January 2004.

[7] Executive Order 13514 of 2009. Federal Register Vol 74 No 194, 52117–52127. October 8, 2009

[8] This letter appears as Appendix IV (pages 39–45) in the GAO report cited in the first footnote.

brings together senior leaders from EPA's programs, regions, and laboratories to address the Agency's high priority science-policy issues.

3&4) Improve the Agency's physical infrastructure and real property planning and investment decisions by: managing individual laboratory facilities as part of an interrelated portfolio of facilities, and ensuring that facility "master plans" are up-to-date and that analysis of the use of space is based on objective benchmarks.

EPA will strengthen its master planning process-which the Agency believes overall has kept the Agency's laboratories and their support buildings in good condition. Over the next 3–5 years the Agency plans to: upgrade and streamline the master planning process; update the plans as required; reinforce the current master planning portfolio perspective; and strengthen the ties between the current annual and five year Building & Facility *call letter* process and the master plans.

5) Improve the completeness and reliability of operating-cost and other data needed to manage its real property and report to external parties.

EPA will continue to refine the master planning process to upgrade and validate its internal operating costs and other metrics. EPA is also reviewing options for improving data reliability and completeness for the remaining labs within its laboratory enterprise.

6) Develop a comprehensive workforce planning process for all laboratories that is based on reliable workforce data and reflects current and future agency needs in the overall number of federal and contract employees, skills, and deployment across all laboratory facilities.

EPA will develop a workforce planning process for its laboratory network as part of a broader Agency workforce planning process.

7) If the EPA Administrator determines that another independent study of EPA laboratories is needed, then the Agency should include—within the charge questions for this study—alternate approaches for organizing the laboratory workforce and infrastructure. These alternate approaches should include options for sharing and consolidation.

The FY 2012 President's Budget includes funds to conduct a study of EPA's laboratory enterprise which considers the long-term research needs of the Agency while seeking opportunities to promote efficiencies and reduce the Agency's physical footprint. This study will be conducted by an independent expert body. EPA will request that this external body consider information in this GAO report and alternate approaches for organizing the workforce and infrastructure of EPA's laboratory network, and explore options for consolidation.

CONCLUSION

In conclusion, I believe that we have a strong tradition of excellence in science at EPA—and that we are poised to build upon this tradition and take environmental protection to the next level. EPA scientists and engineers, as members of, and in collaboration with, the broader scientific community, are applying scientific innovation to spark the scientific and technological breakthroughs that lie just over the horizon—emission-free vehicles; smart phone apps that provide key environmental and health information; benign, "green" chemical processes and products; and water recycling and reuse technologies. Agency scientists, researchers, and their partners, are working toward the vision of a sustainable future.

I look forward to working with the Committee to address current and emerging environmental problems that will help our Agency protect the environment and human health. Thank you for the opportunity to appear before you today.

Chairman HARRIS. Thank you very much, Dr. Anastas.

I now recognize our second witness, Mr. Arthur Elkins, Inspector General of the U.S. Environmental Protection Agency. Mr. Elkins.

STATEMENT OF MR. ARTHUR ELKINS, JR., NSPECTOR GENERAL, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. ELKINS. Thank you. Good afternoon, Chairman Harris, Congressman Tonko, and Members of the Subcommittee. I am Arthur Elkins, Jr., Inspector General at the EPA. I am pleased to appear before you today to discuss recent work conducted by my office re-

lated to EPA's Office of Research and Development. My submitted statement for the record details this work. Today I want to focus on three areas; peer review panels, scientific integrity, and EPA's overall workforce and workload, which have implications for ORD.

Peer review is an important process for enhancing scientific work products so that the decisions made by EPA have a sound, credible basis. In 2009, we reviewed EPA's peer review process in response to concerns about EPA's handling of allegations of a lack of impartiality on one of its peer review panels. Our review focused on EPA's National Center for Environmental Assessment, one of ORD's primary users of peer reviews. We found that the laws, regulations, and requirements governing EPA's peer review process are adequate to produce objective scientific reviews, but that EPA needed to improve its operating guidance. Basically, impartiality was vaguely defined and procedures addressing conflict of interest needed to be improved, as does documentation of resolutions.

We made recommendations to ORD to improve its peer review process in each of these areas. ORD agreed to all of our recommendations and certified that these corrective actions were completed in December 2009.

This year we looked at whether ORD has controls to address scientific integrity and research misconduct, and how effective those controls are. We found that ORD has internal controls that includes policies, procedures, training, and peer review. However, ORD could improve how it evaluates the effectiveness of its policies and procedures for scientific integrity. ORD did not test its policies and procedures because ORD asserted that few reported instances of misconduct meant that it generally does not occur. However, few identified instances could signal that staff lack awareness of criteria and reporting requirements necessary to identify and report misconduct. As part of our work we surveyed ORD science staff on their awareness of EPA scientific integrity policies. We found that nearly 2/3 of respondents were unaware of EPA's policies and procedures on research misconduct, and nearly 1/3 of respondents were unaware of EPA's scientific integrity principles.

We made recommendations to ORD to strengthen their controls and raise awareness about scientific integrity and research misconduct. ORD agreed with our recommendations and plans to complete all corrective actions by September 2012.

For an organization to operate efficiently and effectively it must know what its workload is so that it can accurately determine the resource levels needed to carry out its work. We have issued three reports since 2010 examining how EPA manages its workload and workforce levels overall, which I believe have implications for ORD.

We found that EPA has not collected comprehensive workload data or conducted workload analys is across the Agency in about 20 years. The Agency does not require program offices to collect and maintain workload data. Without sufficient workload data, program offices are limited in their ability to analyze their workloads and accurately estimate resource needs. Therefore, the Agency must base budget decisions primarily on subjective justifications at a time when budgets continue to tighten, and data-driven decisions are critical.

We also found that the agency's policies and procedures do not include a process for determining resource levels based on workload as prescribed by OMB. As a result, the agency cannot demonstrate that it has the right number of resources to accomplish its mission.

Finally, we found that the Agency does not have a coherent program of position management to assure the efficient and effective use of its workforce.

We made several recommendations to address these findings. EPA has not committed to a specific course of action with milestones for completion for many of our recommendations. Therefore, they remain open pending our receipt of an acceptable corrective action plan.

In conclusion, OIG work has identified areas where ORD can improve its operations and activities so it can better provide the solid underpinning of science necessary for EPA regulatory decision making. I believe the OIG has made a positive impact through the many recommendations we have made to ORD in those areas. To their credit, ORD has been receptive to many of our recommendations. We will continue to work with ORD to identify additional areas needing attention.

Thank you for the opportunity to testify before you today. I would be pleased to answer any questions the Subcommittee may have.

[The prepared statement of Mr. Elkins follows:]

PREPARED STATEMENT OF MR. ARTHUR ELKINS, JR., INSPECTOR GENERAL, U.S. ENVIRONMENTAL PROTECTION AGENCY

Good afternoon Chairman Harris, Ranking Member Miller, and Members of the Subcommittee. I am Arthur Elkins, Jr., Inspector General at the U.S. Environmental Protection Agency (EPA). I also serve as the Inspector General of the U.S. Chemical Safety and Hazard Investigation Board. I am pleased to appear before you today for the first time since becoming Inspector General in June 2010 to discuss recent work conducted by my office related to EPA's Office of Research and Development (ORD). As the scientific research arm of EPA, ORD conducts research on ways to prevent pollution, protect human health and the environment, and reduce risk. ORD's role is critical given that EPA relies on sound science to safeguard human health and the environment.

Under the Inspector General Act of 1978, as amended, Inspectors General are tasked with promoting economy and efficiency, and identifying fraud, waste and abuse within their respective agencies. In recent years, the Office of Inspector General (OIG) has increased its focus on ORD's operations and activities. My testimony today highlights the results of this work from 10 selected reports issued since 2009 in the following areas: ORD controls, performance measures and resources; and ORD's role in providing research for decision-making in selected program areas.

ORD Controls, Performance Measures and Resources

OIG work has identified areas for improvement regarding ORD peer review panels, internal controls to address scientific integrity and research misconduct, performance measures, and how EPA manages its workforce and workload that have implications for ORD.

Peer Review Panels

Peer review is a process for enhancing a scientific or technical work product so that the decision or position taken by EPA, based on that product, has a sound, credible basis. The former EPA Deputy Administrator requested we review EPA's peer review process in response to concerns about EPA's handling of allegations of impartiality on one of its peer review panels. Our review focused on EPA's National Center for Environmental Assessment (NCEA) peer review process. Specifically, our objectives were to determine whether: 1) current laws, regulations, guidance, and other relevant requirements for such panels are adequate to produce objective sci-

entific reviews; and 2) the current system of populating and managing such expert panels could be improved.

In our April 2009 report, we noted that NCEA's peer review panel selection process did not differ in many aspects when compared to the processes of four other science-based organizations. One noteworthy difference impacting panel selection was that Federal Advisory Committee Act (FACA) panels, such as the National Academy of Sciences and EPA's Science Advisory Board, attempt to achieve consensus among panelists, and concerns about impartiality of panel members can be mitigated by balancing the panel with varying viewpoints. Since NCEA peer review panels are not designed to obtain consensus, NCEA strives to select "impartial" panelists. However, we found that this concept was vaguely defined in Office of Management and Budget (OMB) and EPA guidance and was not explained in any NCEA-specific operating guidance. Further, NCEA did not have procedures for addressing conflicts of interest or potential biases impacting a panelist's impartiality that became known after a panel had completed its deliberations. Finally, there was no clear documentation of authority and responsibility for making final determinations regarding panel selection or how potential conflicts of interest were resolved.

We made several recommendations to ORD to improve the peer review process. Among them were: 1) define the concept of "impartiality" and maintain records of all management decisions pertaining to the selection of peer reviewers, particularly resolution of potential conflicts of interest; 2) in cases where panelists with potential conflicts or biases are accepted on the panel, the records should include a memorandum of decision explaining the suitability and rationale for including or excluding each panelist, which is signed off on by an EPA official; and 3) develop guidance to address conflict of interest issues that arise after panel formulation and amend contracts for external peer review services to require that panelists re-certify their conflict of interest status prior to the panel convening. ORD agreed to all of our recommendations and provided an acceptable corrective action plan. EPA certified that these corrective actions were completed in December 2009.

Scientific Integrity

Since EPA decision-making relies on science, it is critical that EPA's scientific and technical activities be of the highest quality and credibility. Since 2000, a number of federal and EPA policies on ensuring the integrity of government science have been issued. EPA Order 3120.5 implements the federal policy on research misconduct, and ORD and others formulated the "Principles of Scientific Integrity" and the Principles of Scientific Integrity E-Training to further highlight professional ethics for EPA scientists. We looked at whether ORD has controls to address scientific integrity and research misconduct and how effective those controls are.

We reported in July 2011 that ORD has internal controls that include policies, procedures, training, and peer review. However, ORD should improve how it evaluates the effectiveness of its policies and procedures for scientific integrity and research misconduct. Currently, ORD does not test its policies and procedures because ORD asserts that few reported instances of misconduct means that it generally does not occur. However, few identified instances of research misconduct could signal that staff lacks awareness of key criteria and reporting requirements necessary to identify and report misconduct.

We issued an electronic survey to over 1,300 ORD science staff on their awareness of EPA's scientific integrity and research misconduct policies and procedures. We found that 65 percent of respondents were unaware of EPA Order 3120.5, and 32 percent were unaware of EPA's Principles of Scientific Integrity. We also found that ORD has not updated the Principles of Scientific Integrity E-Training since June 2005. The existing e-training is not mandatory for ORD staff and does not include actual examples to aid understanding by training participants. Sixty-five percent of our survey respondents indicated they had not completed the e-training. Those who have not completed the training may be unaware of key criteria regarding scientific integrity.

We made three recommendations to ORD. First, periodically test the effectiveness of controls in place to address scientific integrity and research misconduct. Second, work across EPA offices to initiate outreach on EPA Order 3120.5 to raise awareness on roles/responsibilities and reporting steps, and to identify EPA staff and managers who should complete the Principles of Scientific Integrity E-Training. Finally, continue to work with unions to update and implement E-training. Without these additional internal control efforts, ORD risks having its science called into question, potentially lessening the credibility of its work. ORD agreed with our recommendations and subsequently followed up with a corrective action plan addressing our recommendations. ORD plans to complete all corrective actions by September 2012.

ORD Performance Measures

In 2010, ORD had twelve national research programs that provided science to support EPA's goals in its strategic plan. One research program, the Land Research Program (LRP), provided the science and technology needed to preserve land, restore contaminated properties, and protect public health from environmental contaminants. The LRP spent $186.2 million on land-related research between fiscal years (FYs) 2005 and 2009. We conducted a review to determine whether the LRP had appropriate performance measures for assessing the effectiveness of its research products.

The difficulty of measuring research performance has been recognized by the National Research Council of the National Academies (NRC) and other authoritative sources. No single measure can adequately capture all elements of research performance. LRP employed a variety of methods to assess its research performance, such as: 1) OMB Program Assessment Rating Tool (PART) measures; 2) client feedback; and 3) peer reviews by EPA's Board of Scientific Counselors (BOSC) who provides advice, information, and recommendations on ORD's research programs.

In our August 2010 report, we noted that improvements were needed in each area to better enable ORD to assess the effectiveness of LRP research products. Key findings included: LRP did not have measures that assessed progress toward short-term outcomes; LRP's citation analysis PART measures were not meaningful to ORD program managers and were not linked to LRP's goals and objectives; ORD's survey of LRP clients did not provide a meaningful measure of customer feedback because ORD's client survey was not reliable; LRP lacked some key measures that would aid BOSC in conducting its LRP program reviews; and ORD had not clearly defined elements of its long-term goal rating guidance for BOSC reviews.

Several underlying issues impacted ORD's development of LRP performance measures. These included the inherently difficult nature of establishing outcome-oriented research measures and ORD's decision not to tailor its measures to each research program. As a result, ORD had invested resources in performance measures and tools that had not effectively measured key aspects of LRP performance. The measures did not provide LRP with the data to assess program progress towards goals, identify areas for program improvement, or track the short-term outcomes of its research.

We made several recommendations to ORD to improve LRP's research measures, including that ORD: 1) develop measures linked to short-term outcomes in LRP's Multi-Year Plan; 2) augment LRP's citation analysis with measures meaningful to ORD program managers and linked to LRP's goals and objectives; 3) develop an implementation plan for the client survey to ensure that the program has a reliable method for assessing relevance (or develop a reliable alternative customer feedback mechanism); 4) provide appropriate performance measurement data to BOSC prior to full program reviews; and 5) revise its long term goal rating guidance to BOSC for program reviews. ORD generally agreed with our recommendations and provided an acceptable plan of action to address our recommendations.

EPA Workload and Workforce

Over the last five years, EPA has averaged over 17,000 positions in its organizational structure with annual payroll costs of approximately $2 billion. ORD's enacted budget for FY 2011 was $582.1 million with an authorizing level of 1907.2 full-time staff. For any organization to operate efficiently and effectively, it must know what its workload is. While there is no one exact definition of workload, it is commonly thought to be the amount of work assigned to, or expected to be completed by, a worker in a specified time period. Workload that is set too high or too low can negatively affect overall performance. The main objectives of assessing and predicting workload are to achieve an evenly distributed, manageable workload and to accurately determine the resource levels needed to carry out the work. The OIG has issued three reports since 2010 examining how EPA manages its workload and workforce levels. While not specifically focused on ORD, our findings and recommendations are applicable to ORD since they span across EPA programs and offices.

We found that EPA has not collected comprehensive workload data or conducted workload analyses across EPA in about 20 years. EPA does not require program offices to collect and maintain workload data, and the programs do not have databases or cost accounting systems in place to collect data on time spent on specific mission-related outputs. OMB guidance states that agencies should identify their workloads to help determine the proper workforce size, and federal accounting standards require that agencies establish cost accounting systems to allow them to determine resources consumed for work performed. Without sufficient workload

data, program offices are limited in their ability to analyze their workloads and accurately estimate resource needs, and EPA's Office of Budget must base budget decisions primarily on subjective justifications at a time when budgets continue to tighten and data-driven decisions are needed.

We also found that EPA's policies and procedures do not include a process for determining resource levels based on workload as prescribed by OMB. Further, EPA does not determine the number of positions needed per mission-critical occupation using workforce analysis as required by the Office of Personnel Management. These conditions occurred because EPA has not developed a workload assessment methodology and has not developed policies and procedures that require workload analysis as part of the budget formulation process. As a result, EPA cannot demonstrate that it has the right number of resources to accomplish its mission.

Finally, we found that EPA does not have a coherent program for position management to assure the efficient and effective use of its workforce. Position management provides the operational link between human capital goals and the placement of qualified individuals into authorized positions. While some organizational components have independently established programs to control their resources, there is no Agency-wide effort to ensure that personnel are put to the best use. Without an Agency-wide position management program, EPA leadership lacks reasonable assurance that it is using personnel in an effective and efficient manner to achieve mission results.

We made several recommendations to address these findings including that EPA: 1) conduct a pilot project requiring EPA offices to collect and analyze workload data on key project activities; 2) amend guidance to require that EPA complete a workload analysis for all critical functions to support its budget request; and 3) establish an Agency-wide workforce program that includes controls to ensure regular reviews of positions for efficiency, effectiveness, and mission accomplishment. EPA has not committed to a specific course of action with milestone dates for completion for many of our recommendations, therefore they remain open pending completion.

ORD Role in Providing Research for Decision-Making in Selected Program Areas

OIG work has also raised concerns about ORD's limited role in chemical risk programs such as the children's chemical evaluation and endocrine disruptor programs, and about the processes and procedures for climate change research and greenhouse gases endangerment finding.

Voluntary Children's Chemical Evaluation Program

EPA utilizes voluntary partnership programs to help it address a wide array of environmental issues by collaborating with companies, organizations and communities. EPA often relies on scientific data provided by its partners and self-certifications rather than independently validate such data. The result is that ORD often plays a limited role in these partnership programs. One example is the Voluntary Children's Chemical Evaluation Program (VCCEP), a pilot program administered by EPA's Office of Chemical Safety and Pollution Prevention (OCSPP) and designed to assess the possible risks from 23 chemicals. EPA asked the manufacturers and importers of these chemicals to volunteer to provide data sufficient for EPA to evaluate the risks of these chemicals to children's health.

In a July 2011 report, we reviewed the VCCEP to determine the outcomes of the program. Overall, we found that poor program design and EPA's failure to use its regulatory authorities under the Toxic Substances Control Act to compel data collection from industry partners resulted in the failure of the VCCEP as an effective children-specific chemical management program. ORD did not have a lead role in any aspect of the program. ORD activities were limited mainly to participating as a stakeholder during the program's design phase, and placing an ORD scientist on the Peer Consultation Panel. The panel, comprised of experts in toxicity testing and exposure evaluations, independently analyzed the submitted data to determine whether additional data was necessary to adequately characterize the risks the chemical may pose to children. An independent third party was used to manage this peer consultation process rather than ORD.

Endocrine Disruptor Screening Program

In our May 2011 report, we reviewed whether EPA has planned and conducted the requisite research and testing to evaluate and regulate endocrine-disrupting chemicals. We specifically focused on EPA's Endocrine Disruptor Screening Program (EDSP), which is administered by OCSPP with support from ORD. The Food Quality Protection Act, passed in 1996, gave EPA the authority to screen and test substances that may have an effect in humans similar to that of a naturally occurring estrogen, or such other endocrine effects as the EPA Administrator may designate.

Congress also passed the Safe Drinking Water Act amendments in 1996, which provided EPA additional discretionary authority to test substances. In 1998, EPA established the EDSP, which uses a two-tiered screening and testing approach to assess endocrine effects.

We found that EPA has not adequately addressed the emerging issue of endocrine disruptors. The program has made little progress in identifying endocrine-disrupting chemicals. While we acknowledge that EDSP encountered difficulties and delays, its lack of progress is also due to EPA's lack of management control over the program. EDSP has not developed a management plan laying out the program's goals and priorities or established outcome performance measures to track program results. EDSP has not finalized specific procedures to evaluate testing results. Finally, EDSP has not clearly defined the universe of chemicals it plans to evaluate over time. Developing a management plan would ensure that the program's goals and priorities are transparent so EPA's leadership and Congress can assess whether the goals of the program are being achieved within reasonable cost and schedule.

ORD provides support for EDSP. EPA established the Endocrine Disruptor Research Program in 1995, which conducts both basic and applied research to develop the fundamental scientific principles used by EPA program and regional offices in making risk assessment decisions. ORD also conducted the underlying research to develop many assays for chemical testing. ORD identified endocrine disruptors as one of its top six research priorities and since 1998, ORD has issued a research plan and two multiyear plans concerning endocrine disruptors. Within the multiyear plans, ORD specifically identified the support of EDSP as one of its three long-term goals. However, ORD stated in its draft Multiyear Plan for Endocrine Disruptors for FY 2007–2013 that the long-term goal of supporting EPA's EDSP will not be carried forward beyond 2011. According to the plan, all future work would be under a different long-term goal. It is unclear what impact, if any, this will have on the program.

Climate Change Research

Since the enactment of the Global Change Research Act of 1990, EPA's research on climate change - also known as global warming—has been part of a national and international framework. EPA is 1 of 13 federal agencies that make up the U.S. Global Change Research Program, which is a multi-agency effort focused on improving our understanding of the science of climate change and its potential impacts. Part of EPA's role is to understand the regional consequences of global change. ORD manages EPA's climate change research function through its Global Change Research Program. EPA's Office of Air and Radiation conducts activities related to mitigating greenhouse gases.

In a February 2009 report we looked at how well EPA policies, procedures, and plans help ensure that its climate change research fulfills its role in climate change. We found that EPA did not have an overall plan to ensure developing consistent, compatible climate change strategies across the Agency. We surveyed EPA regions and offices and found they needed more information on a variety of climate change topics. They needed technical climate change research and tools as well as other climate change policy guidance and direction. We learned that, in the absence of an overall Agency plan, EPA's Office of Water and several regional offices had independently developed, or were developing, their own individual climate change strategies and plans. The lack of an overall climate change policy can result in duplication, inconsistent approaches, and wasted resources among EPA's regions and offices.

At the time of our report, EPA's plan for future climate change research did not address the full range of emerging information needs. Specifically, the projected time of completion or the scope of some research projects did not match the timing or the scope of regions' needs. ORD did not have a central repository of its climate change research for its internal users, nor did it effectively communicate the results of its climate change research to EPA's internal users. While ORD collected research requirements from regions and program offices, the selection criteria for research topics were not transparent to the regions. Finally, ORD did not have a system to track research requests through completion, or a formal mechanism to obtain feedback from its users.

We made several recommendations to ORD to establish various management controls to ensure EPA fulfills its emerging climate change role and related information needs. Among our recommendations was that ORD must continue to routinely update the Science Inventory to include the latest information from its laboratories and centers; establish a formal mechanism to track regional research needs from research project selection to completion; and establish a formal method for coordinating research work with regions and program offices, communicating research re-

sults, and collecting feedback on research products. ORD agreed with our recommendations and has certified that all corrective actions have been completed.

Greenhouse Gases Endangerment Finding

In September 2011, we reported on our review of the process EPA used to make and support its greenhouse gases endangerment finding based on a congressional request. Our objective was to determine whether EPA followed key federal and EPA regulations and policies in obtaining, developing, and reviewing the technical data used to make and support its greenhouse gases endangerment finding. Our review examined the data quality procedures EPA used in developing the endangerment finding. We made no determination regarding the impact that EPA's information quality control systems may have had on the scientific information used to support the finding. We did not test the validity of the scientific or technical information used to support the endangerment finding, nor did we evaluate the merit of EPA's conclusions or analyses.

We found that EPA met statutory requirements for rulemaking and generally followed requirements and guidance related to ensuring the quality of the supporting technical information. However, EPA's peer review of the technical support document (TSD) for the endangerment finding did not meet all OMB requirements for peer review of a highly influential scientific assessment primarily because the review results and EPA's response were not publicly reported, and because 1 of the 12 reviewers was an EPA employee. In our opinion, the TSD was a highly influential scientific assessment because EPA weighed the strength of the available science by its choices of information, data, studies, and conclusions included in and excluded from the TSD. EPA officials told us they did not consider the TSD a highly influential scientific assessment. We also found that no contemporaneous supporting documentation was available to show what analyses EPA conducted prior to disseminating information from other agencies in support of its greenhouse gases endangerment finding.

We recommended that ORD: 1) revise its Peer Review Handbook to accurately reflect OMB requirements for peer review of highly influential scientific assessments; 2) instruct program offices to state in proposed and final rules whether the action is supported by influential scientific information or a highly influential scientific assessment; and 3) revise its assessment factors guidance to establish minimum review and documentation requirements for assessing and accepting data from other organizations. EPA stated that its response to the final report will address our recommendations. We consider our recommendations unresolved pending our receipt and analysis of EPA's response to our final report, which is due at the end of December 2011.

Unimplemented ORD Recommendations

The Subcommittee expressed an interest in OIG recommendations that ORD has not implemented. Unimplemented recommendations refer to recommendations from prior OIG reports on which corrective actions have not been completed. The OIG is mandated by the Inspector General Act to identify unimplemented recommendations in our semiannual reports to Congress. We prepare a Compendium of Unimplemented Recommendations to satisfy this requirement. Our Compendium highlights for EPA management those significant recommendations from previous semiannual reports to Congress that have remained unimplemented past the date agreed upon by EPA and the OIG. It also provides a listing of all of the other significant recommendations with future completion dates.

In our most recent Compendium, we identified one unimplemented recommendation by ORD that is past due from a 2009 report that reviewed actions EPA has taken to mitigate health risks from chemical vapor intrusion at contaminated sites. We specifically recommended that ORD finalize toxicity values for Trichloroethylene and Perchloroethylene in the Integrated Risk Information System database. The agreed-to completion date was September 30, 2011. We also identified eight unimplemented recommendations with future planned completion dates from four reports. Corrective actions are set to be completed by ORD on these recommendations ranging from December 2011 out to 2015.

Planned and Ongoing Work on ORD Activities

In addition to the completed work discussed above, the OIG is currently conducting reviews of other ORD activities that may be of interest to the Subcommittee. One area we are reviewing is ORD's management of Science to Achieve Results (STAR) grants, which fund research grants and graduate fellowships in numerous environmental science and engineering disciplines through a competitive solicitation process and independent peer review. For FYs 2008 through 2010, this

program received over $90 million in funding. We are planning a review of the actions EPA takes before awarding a STAR grant and during its monitoring of a grant to ensure no research misconduct occurs. We expect to start this work during the current FY. We have also started an evaluation of ORD's review process for proposals submitted for one particular STAR grant competition. Specifically, our objectives are to determine whether ORD followed applicable federal and EPA policies and procedures in managing the technical peer review panel process, and communicated with grant applicants in an accurate, timely, appropriate, and transparent manner regarding the status of their proposals. We expect to complete this work by April 2012.

Another area we are currently examining is EPA's approach to nanomaterials, which has become an emerging issue. Nanomaterials are particles so tiny they cannot be detected by conventional microscopes. These miniscule materials are being widely used in consumer products because of their unique properties and potential benefits, but the health and environmental implications associated with their use have not been fully determined. We have started a review to determine how effectively EPA is managing the human health and environmental risks of nanomaterials. We expect to complete this work by January 2012.

Conclusion

OIG work has identified areas where ORD can improve its operations and activities so it can better provide the solid underpinning of science and technology necessary for EPA regulatory decision-making. I believe the OIG has been a positive agent of change through the many recommendations we have made to ORD in those areas. To their credit, ORD has been receptive to many of our recommendations. We will continue to work with ORD to identify additional areas needing attention.

Thank you for the opportunity to testify before you today. I would be pleased to answer any questions the Subcommittee may have.

Chairman HARRIS. Thank you very much, Mr. Elkins.

Our third and final witness, Mr. David Trimble, Director of Natural Resources and Environmental at the U.S. General Accounting Office. Mr. Trimble.

STATEMENT OF MR. DAVID TRIMBLE, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Mr. TRIMBLE. Chairman Harris, Congressman Tonko, and Members of the Subcommittee, I am pleased to be here today to discuss GAO's work on EPA's laboratories. As you know, EPA operates its own laboratories because scientific research, knowledge, and technical information are fundamental to its mission and underpin the policies and regulations the agency implements.

My testimony draws on the report we issued in July of this year on EPA's laboratory operations and will focus on three areas; longstanding planning, coordination, and leadership issues; management of EPA's workload and workforce; and management of EPA's real property.

First, EPA has not fully implemented key recommendations from prior independent evaluations that were aimed at improving longstanding planning, coordination, and leadership issues. A 1992 expert panel recommended that EPA implement a planning process that integrates and coordinates scientific work throughout the agency, including the work of its regional, program, and office and research and development laboratories. EPA has not fully implemented this recommendation.

Instead, these offices independently plan the activities of their respective laboratories based on their own office's priorities and needs. Consequently, the EPA has a limited ability to know if scientific activities are being unintentionally duplicated among the

laboratories or if opportunities exist to collaborate and share scientific expertise, equipment, and facilities across organizational boundaries.

A 1994 evaluation by MITRE recommended EPA consolidate and realign its laboratory facilities and workforce, finding that the geographic separation of laboratories hampered their efficiency and technical operations, and the consolidation and realignment could improve planning and coordination, problems MITRE noted had hampered EPA's science and technical community for years.

EPA has not fully implemented this recommendation and currently operates 37 labs across the Nation. Three studies, including two by the National Research Council, noted that EPA's planning and coordination issues are due in part to the lack of a top science official with the responsibility or authority to coordinate, oversee, and make management decisions regarding major scientific activities throughout the agency.

In a 2000 report on improving science at EPA, NRC noted that the lack of a top science official was a formula for weak scientific performance in the agency and poor scientific credibility outside the agency. Currently EPA operates its laboratories under the direction of 15 different senior officials using 15 different organizational and management structures.

In response to our report EPA has proposed to increase the responsibilities of its science advisor. It is not clear that this will fully address the issue. On this point let me note that the NRC's 2000 report concluded that the designation of ORD as a coordinator for the agency's scientific planning activities had proved to be insufficient because the position did not provide the level of authority or responsibility for oversight, coordination, and decision making. It also noted that the assistant administrator for ORD could not be reasonably expected to direct world-class science at ORD and also try to improve science practices throughout the rest of EPA.

Second, EPA does not use a comprehensive planning process for managing its laboratories' workforce. Many of the regional laboratories provide the same or similar core analytical capabilities, but each region independently determines and attempts to address its individual workforce needs. EPA also lacks basic information on how many scientific and technical employees it has working its laboratories, where they are located, what functions they perform, or what specialized skills they may have.

In addition, the agency does not have a workload analysis for the laboratories to help determine the operable numbers and distribution of staff throughout the enterprise. We believe that such information is essential for EPA to prepare a comprehensive laboratory workforce plan to achieve the agency's mission with limited resources.

Third and finally, EPA does not have complete and accurate data on the real property associated with its laboratories. EPA's 37 labs are housed in 170 buildings and facilities in 30 cities across the Nation. Real property management is a government-wide challenge that has been identified by GAO as a high-risk area.

In 2010, the Administration directed agencies to speed up efforts to identify and eliminate excess properties to help achieve $3 billion in cost savings by 2012. In July, 2010, EPA told OMB that it

did not anticipate disposing of any of its labs in the near future because the facilities were fully used and considered critical to the agency.

However, we found that EPA did not have accurate and reliable information called for by OMB to inform this determination. Specifically, EPA did not have complete or accurate data on the need for the facilities, the property use, facility condition, and the facility's operating efficiency.

This concludes my prepared statement. I would be pleased to answer any questions that you or other Members of the Subcommittee may have.

[The prepared statement of Mr. Trimble follows:]

PREPARED STATEMENT OF MR. DAVID TRIMBLE, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Energy and the Environment, Committee on Science, Space, and Technology, House of Representatives

For Release on Delivery
Expected at 2:00 p.m. EST
Thursday, November 17, 2011

ENVIRONMENTAL PROTECTION AGENCY

Actions Needed to Improve Planning, Coordination, and Leadership of EPA Laboratories

Statement of David C. Trimble
Natural Resources and Environment

U.S. Government Accountability Office
GAO 90 YEARS 1921-2011
ACCOUNTABILITY ★ INTEGRITY ★ RELIABILITY

GAO-12-236T

Chairman Harris, Ranking Member Miller, and Members of the Subcommittee:

I am pleased to be here today to discuss the research and development activities of the Environmental Protection Agency (EPA) and the findings of our recent report on the agency's laboratory enterprise.[1] EPA was established in 1970 to consolidate a variety of federal research, monitoring, standard-setting, and enforcement activities into one agency for ensuring the joint protection of environmental quality and human health.[2] Scientific research, knowledge, and technical information are fundamental to EPA's mission and inform its standard-setting, regulatory, compliance, and enforcement functions. The agency's scientific performance is particularly important as complex environmental issues emerge and evolve, and controversy continues to surround many of the agency's areas of responsibility. Unlike other primarily science-focused federal agencies, such as the National Institutes of Health or the National Science Foundation, EPA's scientific research, technical support, and analytical services underpin the policies and regulations the agency implements. Therefore, the agency operates its own laboratory enterprise. This enterprise is made up of 37 laboratories that are housed in about 170 buildings and facilities located in 30 cities across the nation. Specifically, EPA's Office of Research and Development (ORD) operates 18 laboratories with primary responsibility for research and development. Four of EPA's five national program offices[3] operate nine laboratories with primary responsibility for supporting regulatory implementation, compliance, enforcement, and emergency response. Each of EPA's 10 regional offices operates a laboratory with responsibilities for a variety of applied sciences; analytical services; technical support to federal, state, and local laboratories; monitoring; compliance and enforcement; and emergency response.

[1]GAO, *Environmental Protection Agency: To Better Fulfill Its Mission, EPA Needs a More Coordinated Approach to Managing Its Laboratories*, GAO-11-347 (Washington, D.C.: July 25, 2011).

[2]Reorganization Plan No. 3 of 1970, 35 Fed. Reg. 15623 (Dec. 2, 1970) (5 U.S.C. Appendix 1).

[3]The national program offices with laboratories are the Office of Air and Radiation, the Office of Enforcement and Compliance Assurance, the Office of Chemical Safety and Pollution Prevention, and the Office of Solid Waste and Emergency Response.

Over the past 20 years, independent evaluations by the National Research Council and others have addressed planning, coordination, or leadership issues associated with EPA's science activities.[4] The scope of these evaluations varied, but collectively they recognized the need for EPA to improve long-term planning, priority setting, and coordination of laboratory activities; establish leadership for agencywide scientific oversight and decision making; and better manage the laboratories' workforce and infrastructure. When it was established in 1970, EPA inherited 42 laboratories from programs in various federal departments. According to EPA's historian, EPA closed or consolidated some laboratories it inherited and created additional laboratories to support its mission. Nevertheless, EPA's historian reported that the location of most of EPA's present laboratories is largely the same as the location of its original laboratories in part because of political objections to closing facilities and conflicting organizational philosophies, such as operating centralized laboratories for efficiency versus operating decentralized laboratories for flexibility and responsiveness. Other federal agencies face similar challenges with excess and underused property. Because of these challenges, GAO has designated federal real property as an area of high risk.[5]

This statement summarizes the findings of our report issued in July of this year that examines the extent to which EPA (1) has addressed the findings of independent evaluations performed by the National Research Council and others regarding long-term planning, coordination, and leadership issues; (2) uses an agencywide, coordinated approach for managing its laboratory physical infrastructure; and (3) uses a comprehensive planning process to manage its laboratory workforce. In preparing this testimony, we relied on the work supporting our July report. In conducting that work, we reviewed agency documents and independent evaluations, visited EPA laboratories, interviewed agency officials, and examined agency databases; our recent report contains a detailed description of our scope and methodology. All of the work for our July report was performed in accordance with generally accepted government auditing standards.

[4]The National Research Council is the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering.

[5]High-Risk Series: An Update, GAO-11-278 (Washington, D.C.: February 2011).

EPA Has Not Fully Addressed Findings of Evaluations on Long-standing Planning, Coordination, or Leadership Issues

EPA has taken some actions but has not fully addressed the findings and recommendations of five independent evaluations over the past 20 years regarding long-standing planning, coordination, and leadership issues that hamper the quality, effectiveness, and efficiency of its science activities, including its laboratory operations.

First, EPA has yet to fully address planning and coordination issues identified by a 1992 independent, expert panel evaluation that recommended that EPA develop and implement an overarching issue-based planning process that integrates and coordinates scientific efforts throughout the agency, including the important work of its 37 laboratories.[6] That evaluation found that EPA's science was of uneven quality and that the agency lacked a coherent science agenda and operational plan to guide scientific efforts throughout the agency. Because EPA did not implement the evaluation's recommendation, EPA's programs, regional officials, and ORD continue to independently plan and coordinate the activities of their respective laboratories based on their own offices' priorities and needs.

Second, EPA has also not fully addressed recommendations from a 1994 independent evaluation by the MITRE Corporation to consolidate and realign its laboratory facilities and workforce[7]—even though this evaluation found that the geographic separation of laboratories hampered their efficiency and technical operations and that consolidation and realignment could improve planning and coordination issues that have hampered its science and technical community for decades. In its evaluation, MITRE recommended that EPA (1) realign and consolidate the ORD laboratories; (2) consolidate program laboratories in the Office of Prevention, Pesticides, and Toxic Substances[8] and the two laboratories under the Office of Radiation and Indoor Air; and (3) through consolidation, reduce the number of regional office laboratories to a few laboratories with a national service focus. In response to the MITRE

[6]Environmental Protection Agency, *Safeguarding the Future: Credible Science, Credible Decisions, The Report of the Expert Panel on the Role of Science at EPA*, EPA/600/9-91/050 (Washington, D.C.: March 1992).

[7]MITRE Corporation, Center for Environment, Resources, and Space, *Assessment of the Scientific and Technical Laboratories and Facilities of the U.S. Environmental Protection Agency* (McLean, Va., May 1994).

[8]Now known as the Office of Chemical Safety and Pollution Prevention.

study, an agencywide steering committee formed by EPA to consider restructuring and consolidation options issued a report to the Administrator in July 1994.[9] The steering committee report stated that combining ORD laboratories at a single location could improve teamwork and raise productivity but concluded that, for the near term, ORD should be functionally reorganized but not physically consolidated. Regarding program office laboratory consolidations, the Office of Radiation and Indoor Air did not physically consolidate its laboratories but did administratively and physically consolidate its Las Vegas laboratory with ORD's Las Vegas radiation laboratory, and the Office of Prevention, Pesticides, and Toxic Substances colocated three of four laboratories with the region 3 laboratory. As for the regional laboratories, the steering committee's report endorsed the current decentralized regional model but did not provide a justification for its position.

Third, EPA has not fully addressed recommendations from the independent evaluations regarding leadership of its research and laboratory operations.[10] More specifically, EPA has not appointed a top science official with responsibility and authority for all the research, science, and technical functions of the agency— even though one study found that the lack of a top science official was a formula for weak scientific performance in the agency and poor scientific credibility outside the agency. Instead, EPA's efforts to establish leadership over its laboratory enterprise have relied on advisory positions and councils to achieve consensus and voluntary cooperation of ORD and the agency's program and regional offices. Because of the limited success of EPA's advisory positions and councils and in the absence of a central science policy authority, the National Research Council in 2000 recommended that EPA request authority from Congress to create a new position of deputy administrator for science and technology, with managerial authority to coordinate and oversee all the agency's scientific and

[9]Environmental Protection Agency, *Research, Development, and Technical Services at EPA: A New Beginning,* Report to the Administrator, EPA/600/R-94/122 (Washington, D.C.: July 1994).

[10]National Research Council, *Interim Report of the Committee on Research and Peer Review in EPA* (Washington, D.C., National Academies Press, 1995); Environmental Protection Agency, Office of Inspector General, Regional Laboratories (Washington, D.C., Aug. 20, 1997); and National Research Council, *Strengthening Science at the U.S. Environmental Protection Agency: Research-Management and Peer Review Practices* (Washington, D.C., National Academies Press, 2000).

technical activities. To date, EPA has not requested authority to create a new position of deputy administrator for science and technology and continues to operate its laboratories under the direction of 15 different senior officials using 15 different organizational and management structures. As a result, EPA has a limited ability to know if scientific activities are being unintentionally duplicated among the laboratories or if opportunities exist to collaborate and share scientific expertise, equipment, and facilities across EPA's organizational boundaries.

EPA Has Not Taken an Agencywide, Coordinated Approach to Manage Its Laboratory Physical Infrastructure

On the basis of our analysis of EPA's facility master planning process, we found that EPA manages its laboratory facilities on a site-by-site basis and does not evaluate each site in the context of all the agency's real property holdings—as recommended by the National Research Council report in 2004.[11] EPA's facility master plans are intended to be the basis for justifying its building and facilities spending, which was $29.9 million in fiscal year 2010, and allocating those funds to specific repair and improvement projects. Master plans should contain, among other things, information on mission capabilities, use of space, and condition of individual laboratory sites. In addition, we found that most facility master plans were out of date. EPA's real property asset management plan states that facility master plans are supposed to be updated every 5 years to reflect changes in facility condition and mission, but we found that 11 of 20 master plans were out of date and 2 of 20 had not been created yet.[12]

Because EPA makes capital improvement decisions on a site-by-site basis using master plans that are often outdated, it cannot be assured it is allocating its funds most appropriately. According to officials responsible for allocating capital improvement resources, they try to spread these funds across the agency's offices and regions equitably but capital improvement funds have not kept pace with requests. The pressure and need to effectively share and allocate limited resources among EPA's many laboratories were also noted in a 1994 National Academy of Public Administration report on EPA's laboratory infrastructure, which found that

[11]National Research Council, *Investments in Federal Facilities: Asset Management Strategies for the 21st Century* (Washington, D.C., National Academies Press, 2004).

[12]Master plans are created for owned properties only. We found there were no master plans for two laboratory properties located in Research Triangle Park, N.C., and Fort Meade, Md. We also found that 9 of the 11 outdated master plans were over 10 years old.

EPA has "too many labs in too many locations often without sufficient resources to sustain a coherent stable program."[13]

In addition, because decisions regarding laboratory facilities are made independently of one another, opportunities to improve operating efficiencies can be lost. Specifically, we found cases where laboratories that were previously colocated moved into separate space without considering the potential benefits of remaining colocated. In one case, we found that the relocation increased some operating costs because the laboratories then had two facility managers and two security contracts and associated personnel because of different requirements for the leased facility. In another case, when two laboratories that were previously colocated moved into separate new leased laboratories several miles apart, agency officials said that they did not know to what extent this move may have resulted in increased operating cost.

EPA also does not have sufficiently complete and reliable data to make informed decisions for managing its facilities. Since 2003, when GAO first designated federal real property management as an area of high risk, agencies have come under increasing pressure to manage their real property assets more effectively.[14] In February 2004, the President issued an executive order directing agencies to, among other things, improve the operational and financial management of their real property inventory.[15] The order established a Federal Real Property Council within the Office of Management and Budget (OMB), which has developed guiding principles for real property asset management. In response to a June 2010 presidential memorandum directing agencies to accelerate efforts to identify and eliminate excess properties,[16] in July 2010 EPA reported to the OMB that it does not anticipate the disposal of any of its owned laboratories and major assets in the near future because these assets are

[13]National Academy of Public Administration, *A Review, Evaluation, and Critique of a Study of EPA Laboratories by the MITRE Corporation and Additional Commentary on EPA Science and Technology Programs* (Washington, D.C., May 1994), 10.

[14]High-Risk Series: An Update, GAO-011-278 (Washington, D.C.: February 2011).

[15]Federal Real Property Asset Management, Exec. Order No. 13327, 69 Fed. Reg. 5897 (Feb. 4, 2004).

[16]Presidential Memorandum, Disposing of Unneeded Federal Real Estate, 75 Fed. Reg. 33987 (June 16, 2010).

fully used and considered critical for EPA's mission.[17] EPA stated that decisions regarding facility disposal are made using the Federal Real Property Council's guidance but we found that EPA does not have the information needed to effectively implement this guidance. Specifically, EPA does not have accurate, reliable information regarding (1) the need for facilities, (2) property usage, (3) facility condition, and (4) facility operating efficiency—thereby undermining the credibility of any decisions based on this approach.

- First, EPA does not maintain accurate data to determine if there is an agency need for laboratory facilities because many facility master plans are often out of date. According to EPA's asset management plan, the master plans are tools that communicate the link between mission priorities and facilities. However, without up-to-date master plans, EPA does not have accurate data to determine if laboratory facilities are needed for its mission.

- Second, the agency does not have accurate data on space needs and usage because many facility master plans containing space utilization analyses are out of date. EPA also does not use public and commercial space usage benchmarks—as recommended by the Federal Real Property Council—to calculate usage rates for its laboratories. Instead, EPA measures laboratory usage on the basis of interviews with local laboratory officials. According to EPA officials, they do not use benchmarks because the work of the laboratories varies. In 2008, however, an EPA contractor created a laboratory benchmark based on those used by comparable facilities at the Centers for Disease Control and Prevention, the National Institutes of Health, the Department of Energy, and several research universities to evaluate space at two ORD laboratories in North Carolina. Consequently, we believe that objective benchmarks can be developed for EPA's unique laboratory requirements. In addition, the contractor's analysis concluded that EPA could save $1.68 million in annual leasing and $800,000 in annual energy costs through consolidation of the two ORD laboratories. Agency officials told us they hope to consolidate the laboratories in fiscal year 2012 if funds are available.

[17]Environmental Protection Agency, *Real Property Cost Savings and Innovation Plan* (Washington, D.C., July 23, 2010.

- Third, the agency does not have accurate data for assessing facilities' condition because condition assessments contained in facility master plans are often outdated. The data may also be unreliable because data entered by local facility managers are not verified, according to agency officials. Such verification could involve edit checks or controls to help ensure the data are entered accurately.

- Fourth, EPA does not have reliable operating cost data for its laboratory enterprise, because the agency's financial management system does not track operating costs in sufficient detail to break out information for individual laboratories or for the laboratory enterprise as a whole. Reliable operating cost data are important in determining whether a laboratory facility is operating efficiently, a determination that should inform both capital investment and property disposal decisions.

EPA Does Not Use a Comprehensive Workforce Planning Process for Its Laboratories

EPA does not use a comprehensive planning process for managing its laboratories' workforce. For example, we found that not all of the regional and program offices with laboratories prepared workforce plans as part of an agencywide planning effort in 2007, and for those that did, most did not specifically address their laboratories' workforce. In fact, some regional management and human resource officials we spoke with were unaware of the requirement to submit workforce plans to the Office of Human Resources. Some of these managers told us the program and regional workforce plans were a paperwork exercise, irrelevant to the way the workforce is actually managed. Managers in program and regional offices said that workforce planning for their respective laboratories is fundamentally driven by the annual budgets of program and regional offices and ceilings for full-time equivalents (FTE).[18]

In addition, none of the program and regional workforce plans we reviewed described any effort to work across organizational boundaries to integrate or coordinate their workforce with the workforces of other EPA laboratories. For example, although two regional workforce plans discussed potential vulnerability if highly skilled laboratory personnel retired, neither plan explored options for sharing resources across

[18]An FTE consists of one or more employed individuals who collectively complete 2,080 work hours in a given year. Therefore, one full-time employee or two half-time employees equal one FTE.

regional boundaries to address potential skill gaps. According to *EPA's Regional Laboratory System 2009 Annual Report*, many of the regional laboratories provide the same or similar core analytical capabilities—including a full range of routine and specialized chemical and biological testing of air, water, soil, sediment, tissue, and hazardous waste. Nonetheless, in these workforce plans, each region independently determines and attempts to address its individual workforce needs. As a result, by not exploring options for sharing resources among the ORD, program, and regional boundaries to address potential skill gaps, EPA may be missing opportunities to fill critical occupation needs through resource sharing.

Moreover, EPA does not have basic demographic information on the number of federal and contract employees currently working in its 37 laboratories. Specifically, EPA does not routinely compile the information needed to know how many scientific and technical employees it has working in its laboratories, where they are located, what functions they perform, or what specialized skills they may have. In addition, the agency does not have a workload analysis for the laboratories to help determine the optimal numbers and distribution of staff throughout the enterprise. We believe that such information is essential for EPA to prepare a comprehensive laboratory workforce plan to achieve the agency's mission with limited resources. Because EPA's laboratory workforce is managed separately by 15 independent senior officials, information about that workforce is tracked separately and is not readily available or routinely compiled or evaluated. Instead, EPA has relied on ad hoc calls for information to compile such data.

In response to our prior reports on EPA's workforce strategy[19] and the work of the EPA Inspector General, EPA hired a contractor in 2009, in part to conduct a study to provide information about the agency's overall workload, including staffing levels and workload shifts for six major

[19]GAO, *Human Capital: Implementing an Effective Workforce Strategy Would Help EPA to Achieve Its Strategic Goals,* GAO-01-812 (Washington, D.C.: July 31, 2001); *Human Capital: Key Principles for Effective Strategic Workforce Planning,* GAO-04-39 (Washington, D.C.: Dec. 11, 2003); *Clean Water Act: Improved Resource Planning Would Help EPA Better Respond to Changing Needs and Fiscal Constraints,* GAO-05-721 (Washington, D.C.: July 22, 2005); *EPA's Execution of Its Fiscal Year 2007 New Budget Authority for the Enforcement and Compliance Assurance Program in the Regional Offices,* GAO-08-1109R (Washington, D.C.: Sept. 26, 2008); *Environmental Protection Agency: Major Management Challenges,* GAO-09-434 (Washington, D.C.: Mar. 4, 2009).

functions, including scientific research. In its budget justification for fiscal year 2012, however, the agency reported to Congress that a survey of the existing workload information provided by the contractor will not immediately provide information sufficient to determine whether changes are needed in workforce levels. As of October 2011, EPA had not released the results of this study, and we therefore cannot comment on whether its content has implications for the laboratories. The agency asked its National Advisory Council for Environmental Policy and Technology to help address scientific and technical competencies as it develops a new agencywide workforce plan. However, the new plan is not complete, and therefore it is too early to tell whether the council's recommendations will have implications for the laboratories.

Finally, in our July 2011 report on EPA's laboratory enterprise we recommended, among other things, that EPA develop a coordinated planning process for its scientific activities and appoint a top-level official with authority over all the laboratories, improve physical and real property planning decisions, and develop a workforce planning process for all laboratories that reflects current and future needs of laboratory facilities. In written comments on the report, EPA generally agreed with our findings and recommendations.

Chairman Harris, Ranking Member Miller, this concludes my prepared statement. I would be happy to respond to any questions that you or other members of the subcommittee may have at this time.

GAO Contact and Staff Acknowledgments

For further information on this statement, please contact David Trimble at (202) 512-3841 or trimbled@gao.gov. Contact points for our Congressional Relations and Public Affairs offices may be found on the last page of this statement. Other staff that made key contributions to this testimony include Diane LoFaro, Assistant Director; Jamie Meuwissen; Angela Miles; and Dan Semick.

Chairman HARRIS. Thank you very much, Mr. Trimble, and I thank the panel for their testimony. Reminding Members that Committee rules limit questioning to five minutes. The chair will at this point open the round of questions, and I recognize myself for five minutes. And, again, thank you all for being here.

Dr. Anastas, I have got some questions with regards to science and some with regards to administration. Let me start with regards to science.

I understand that actually the EPA just issued its—the outline of how it is going to study the hydrofracturing. I think it was just issued a couple of weeks ago, and I understand part of that is the EPA plans to retrospectively sample its sights.

Now, I got to ask, I mean, when I remember back to epidemiology, you only sampled retrospectively when prospective data is either, you know, unavailable or too expensive to obtain, but there are thousands of hydrofracturing wells being drilled where you can prospectively obtain data. Why would you choose retrospective data analysis? Again, this goes to the quality of the data that you are going to gather.

I am sorry. Your mic is not on.

Dr. ANASTAS. Thank you for the question. The study is designed to both include retrospective and prospective data. The retrospective data is to look at sites that have had reports of contamination to, one, verify if that contamination has, indeed, taken place, and two, what the cause of that contamination, if it——

Chairman HARRIS. And that is exactly my point, Dr. Anastas, and I am sorry because we have got a few so I have got to rush you along a little bit, but you could never know how that contamination took place. All you know is the contamination is there then. You don't know if it naturally was occurring at that site, if it occurred before the hydrofracturing occurred.

I mean, I got a real problem when we say we are going to do really good science, and then we say, well, by the way, we are going to look at something retrospectively that we can do prospectively.

Now, at those samplings my understanding is that yesterday EPA indicated would not permit industry to shadow EPA when it sampled its sites. Now, you said that integrity—the one way you ensure integrity or at least encourage the perception of integrity is through transparency. Why wouldn't you want someone to be there when you sample the sites? Was that a decision that you all made or someone else in the—you know, your shop made or someone else?

Dr. ANASTAS. The study is designed to have very close interaction with partners who are at the sites.

Chairman HARRIS. Doctor, you know exactly what I am asking you. Can industry representatives be there when you sample these sites? I am being told that EPA indicated they would not permit industry to shadow EPA at the sampling of sites.

Do you have something to hide with the way you sample? If not, why not let the sun shine in?

Dr. ANASTAS. Of course not.

Chairman HARRIS. You will reconsider that decision you think?

Dr. ANASTAS. I think that the study is designed so that if the property owner allows for the presence of people beyond EPA on

that site, then we have every desire to work collaboratively and as openly as possible.

Chairman HARRIS. Boy, am I glad to here that. Thank you very much.

Now, you said that science, Lisa Jackson says science is the backbone of EPA, and I want to read you a couple of things that she said, and I am going to ask you as a scientist if you agree.

She said, "We are actually at the point in many areas of the country where on a hot summer day the best advice we can give you is don't go outside, don't breathe the air, it might kill you."

Do you think that is the way a scientist would word findings? Are you comfortable with that as a scientist?

Dr. ANASTAS. I believe the administrator was talking about the air quality concerns that she had and that when we are not doing what is needed to be done to improve the air quality that it is unacceptable that the advice is to simply stay inside.

Chairman HARRIS. Don't breathe the air. It might kill you. Okay.

Now, she also said in September that, "If we could reduce particulate matter to health levels, it would have the same impact as finding a cure for cancer." Dr. Anastas, 600,000 people in this country died from cancer. You—are you going to say scientifically, you are going to tell us that if we just reduce particulate matter to healthy levels, we are going to save 600,000 lives a year?

Dr. ANASTAS. I believe what the administrator was saying was that the dramatic health benefits to reducing particulate matter statistically have the type of dramatic increase that you would have on increasing the battle against cancer.

Chairman HARRIS. Six hundred thousand deaths a year. Dr. Anastas, a scientist, true standard deviations out from your estimate, does it include 600,000 deaths being avoided?

Dr. ANASTAS. I do not have the numbers.

Chairman HARRIS. Could you get me the numbers because that leads to my point, and I only have about 30 seconds I guess. I have asked for that exact information from someone who testified in front of this committee two months ago, and it said that the cross-state regulations avoid, "up to 34,000 premature deaths."

Now, Dr. Anastas, you are a scientist. That is not the way you word a result. That is the way you word a discussion, something else, opinion. The scientific answer is it is this estimate, this is the range of the estimate, and this is how I derived it. That is a pretty simple question I asked two months ago. Where is the holdup at the EPA? Is it your office, or is it some other place to get that very simple answer? Where does 34,000 come from, what does up to 34,000 mean, what are the standard deviations associated with that estimate, is it a summary of the individual estimates that, you know, because you and I both know how you can get up to 34,000. You can take zero to 1,000 34 times and actually have a chance of it being zero. And yet I could say that it is up to 34,000.

And you know as a scientist that wouldn't be subject to rigorous examination. So where is the holdup? Do you have any idea why I have to wait two months for a simple answer?

Dr. ANASTAS. I will be happy to follow up with you to get those—that information to you.

Chairman HARRIS. Thank you so very, very much, because, you know, I agree with you that, you know, science should be the backbone of EPA, and I agree with you that transparency will paint a—will contribute to the perception of integrity, but we have got to have both those things. Thank you, Doctor.

And I now recognize Mr. Miller for five minutes, and welcome.

Mr. MILLER. Thank you, and I apologize for arriving on a dead run and not having been part of the hearing to this point. I did chair the Oversight Subcommittee of this Committee, the Science Committee, for four years and in the 2007 to 2009 period, a turnaround time of two months from any agency in the Bush Administration would have been a great turnaround time.

Mr. Elkins, you conducted a report on the EPA's peer review process, and you determined the EPA's peer review process was, your term was adequate to produce objective scientific review, and you said in your written testimony that there are areas where EPA's peer review process can be improved.

Please tell us how the peer review process is adequate and how it could be better than adequate.

Mr. ELKINS. Well, our report for the most part looked at areas related to potential conflicts of interest in the peer review process and whether or not EPA adequately had procedures in place to not allow a conflict of interest to occur. What we found is that the procedures that EPA had in place did not adequately address that issue, but generally speaking we found that the peer review process was adequate.

After our report was issued EPA agreed with our recommendations, amended its peer review handbook, and as of today it is adequate.

Mr. MILLER. Okay, and how long ago did they make those changes in their peer review process based on your recommendations?

Mr. ELKINS. I don't have that information with me. I believe that report was back in 2009. I can get that for you if you would like.

Mr. MILLER. Okay. I think this hearing is based upon a GAO report that I requested, and I requested it based on the Subcommittee's work, to see if EPA's agency-wide management of its research enterprise and laboratory infrastructure was all that it could be, and we have seen the results of those criticisms being a much broader criticism of EPA science, not just whether it was well managed or properly coordinated but whether it was honest and reliable.

Dr. Trimble, in your investigation did you find any reason to question the quality of EPA scientific results? Was the science still valid?

Mr. TRIMBLE. The scope of our work did not go into issues of scientific quality. That would not be something that we would venture into, not being a science agency. Our work is really more are they positioned organizationally to be as strong as they could be.

Mr. MILLER. Okay. So you simply did not look at that. You have no reason based upon your evaluation, there is nothing in your evaluation that questions the quality of EPA's scientific work?

Mr. TRIMBLE. No, sir.

Mr. MILLER. Dr. Anastas, in light of the various problems or suggestions that GAO has made, what is the EPA now doing to ensure the quality and credibility of the scientific data and results? Are you changing based on the GAO's study?

Dr. ANASTAS. In short the answer is yes. The recommendations from the GAO are welcome. Our response to the GAO enunciates how we are positively responding to those recommendations, each of those recommendations. Those responses are detailed in my written testimony and in short, we welcome the suggestions and outline how we are proceeding to act on those recommendations.

Mr. MILLER. Okay. Mr. Chairman, I will yield back 40 seconds.

Chairman HARRIS. Thank you very much.

The chair now recognizes our colleague from California, Mr. Rohrabacher, for five minutes.

Mr. ROHRABACHER. Thank you very much, and thank you very much, Mr. Chairman, for the leadership that you are showing on this very significant issue of scientific integrity and the EPA. Those of us who have been around for awhile have seen that there are various methodologies that people utilize to obtain their political agenda, and I would have to say that in my 30 years here in Washington I have never seen the politicalization of science so dramatically as we have in the last few years. But there has been evidence that for longer than that, of course.

Let me just note that we have the IG here, the EPA's IG here. You stated and there is word from your office that the peer review process, which is, of course, one of the mainstays into the scientific process, when applied to greenhouse gas endangerment findings, that the EPA did not meet OMB's actual requirements for a peer review that withstands, that basically meets the standard. Is that correct?

Mr. ELKINS. Well, what our report looked at is process, and what we—what our report stated was that we believe that the endangerment finding process should have incorporated a highly-influential scientific assessment, and if you follow that model, there are certain steps that need to occur as opposed to just the influential scientific assessment.

Mr. ROHRABACHER. Uh-huh.

Mr. ELKINS. And so our findings was based that if the HISA was not—that the EPA did not consider or they did not follow the HISA process when they——

Mr. ROHRABACHER. So it didn't meet the OMB requirements in this case. So those requirements had said it wasn't met and maybe you could tell us what has been done to alleviate that problem. Peer review of greenhouse gas research seems to have been compromised. How have you corrected that?

Dr. ANASTAS. As Inspector General Elkins noted, there was no—and I believe as you know there is no determination that there was any problems at all with the science. What was looked at was the process. The——

Mr. ROHRABACHER. But if the process is faulty, you can't say that the outcome, oh, boy, the IG didn't find the outcome bad. If the process is bad, you don't know what your outcome is.

Dr. ANASTAS. The EPA made the determination——

Mr. ROHRABACHER. Okay.

Dr. ANASTAS. —that this was not a high-impact scientific assessment according to the OMB bulletin, a high-impact scientific assessment, that it was not a high-impact scientific assessment according to the OMB bulletin, and OMB agreed with that determination.

Mr. ROHRABACHER. So you did nothing. Thank you.

Dr. ANASTAS. And if I may——

Mr. ROHRABACHER. So you determined that you didn't have to do anything even though you found that—even though the IG's office right there has found that you didn't meet the right standard.

Dr. ANASTAS. And yet despite following OMB's direction we have still taken the IG's recommendations and are addressing each of those recommendations and will be addressing them fully.

Mr. ROHRABACHER. Well, we would hope that the next time that we hear that your IG reporting that your peer review process doesn't meet the OMB standards, that maybe they will be able to report that you do next time, but at this point I am not sure what your answer reflects, whether or not you have done anything differently, but we will see what the IG's report says next time around.

The—let me just note that when you determine that there is a problem to be examined and that you are—then the EPA moves forward that now something is going to be regulated because you found a problem with it, it automatically means that there is a lot of things that the people are going to have to do now that they otherwise wouldn't have to do.

There is a great deal of expense that takes place in our society based on your finding that there is a problem, and even though—and I would like you to tell me why, and let me see if I can pronounce it right, perchlorate. I have been noticing here, and I have been given by my staff, that the National Academy of Sciences and others have not found any problem with perchlorate, but the EPA has designated it as something that needs to be regulated by the EPA.

Now, why is that? What is the scientific basis that you disagree with the National Academy of Sciences and others who did not find that a problem?

Dr. ANASTAS. The scientific assessment of perchlorate had findings about the hazard, the degree of hazard of perchlorate. The determination of whether or not to regulate has certainly scientific input and other statutory considerations that need to be considered when making that determination. In whole all of those factors are considered by the administrator in making that determination.

Mr. ROHRABACHER. Thank you very much. I yield back. Thank you.

Chairman HARRIS. I now recognize the gentleman from New York, Mr. Tonko, for five minutes.

Mr. TONKO. Thank you, Mr. Chair.

Dr. Anastas, thank you for your testimony and to all of you on the panel. But Doctor, in your testimony you mentioned that ORD has organized its research into six areas, providing ORD with opportunities to more effectively plan in what is a coordinated way rather than the ongoing individual basis.

How do these six areas of research align with the research areas of the program and regional offices?

Dr. ANASTAS. Thank you for the question because it is the—it is that alignment that is the basis of why we undertook this effort. What has been done is to—rather than look at fragmented programs, instead engage our offices of water and air and solid waste in order to determine what the highest priority there is are and have that discussion directly between the program offices, the regional offices, and our researchers in ORD.

It was through that very intensive process over the course of the past year that we identified these crosscutting areas that will not only give greater synergies and flexibility but I believe there is agreement not only internally but by our Science Advisory Board and our Board of Scientific Counselors that this will make it more effective in being responsive to those high-priority areas.

Mr. TONKO. Now, when you do that, there might be a concern for duplication or overlap, and just what does the agency do to ensure that there isn't any of the overlap or duplication between ORD's research, for instance, and that of their program offices?

Dr. ANASTAS. Yes. It is this effort, these conversations between ORD and the program offices that quite frankly are happening more now than any time in the past, that are looking to ensure that we don't have duplication. Those are the conversations that are taking place not only with individual offices but across program offices to ensure either complementarity to make sure that they are not—there is not duplication.

Mr. TONKO. Thank you, and Dr. Anastas, you mentioned that ORD takes steps to ensure that there is an involvement by the program and regional offices in ORD's research planning process. You also indicate that ORD provides scientific expertise to those program offices as they develop those regulations and their policy.

Now, does ORD have involvement in the research planning process of the program offices?

Dr. ANASTAS. Yes. It is part of the same discussions that the program offices and the regional offices are, as I described, have complementary duties, complementary responsibilities. So the Office of Research obviously has responsibility for research, but other scientific analysis will take place in the program office, technical support, generation of data for immediate needs will take place in the regional offices, and those are coordinated through these conversations.

Mr. TONKO. And what impediments, if any, are there to ORD and the program offices from being involved in one another's research planning process?

Dr. ANASTAS. I believe that the efforts that we have undertaken over the course of the past year have removed many of those impediments and have—these regular dialogues, these formalized meetings, this regular follow-up is looking to and I think quite successfully removing the historical impediments.

Mr. TONKO. Now, you say most of them. Are there any that might exist for which there is a concern or where there is a need for better flow or interaction?

Dr. ANASTAS. I would be happy to give a thoughtful answer to that, and I will be happy to follow up if I can think of any additional impediments.

Mr. TONKO. Thank you very much.

Mr. Chair, I yield back.

Chairman HARRIS. Thank you very much, and I will take advantage of the 40 seconds that the gentleman had to ask Dr. Anastas one question that is kind of burning to me because we would like to wrap this up before we go to vote.

As a scientist, purely as a scientist, forget the EPA hydrofracturing study, forget that there is language saying, you know, we urge the EPA, which we know that is not, you know, statutory, binding, as a scientist, you have five objectives. You are looking at five things in the lifecycle, and that is—one is, you know, whether or not you are withdrawing ground water, affecting groundwater resource, but then the last four have to do with contamination of ground water. Let's talk about those last four.

Your testimony yesterday at Transportation & Infrastructure, there have been 1.2 million hydrofracturing wells drilled with no documented case of drinking water contamination, no—and I asked the panel, I keep on asking every panel, is there any—no. As a scientist 1.2 million applications of a technology with no documented affect on those last four things that study is looking for.

Will you—I mean, do they come to you and say, look. Dr. Anastas, as a scientist should we really be studying that? Do we really need to study it? Did that question ever occur, or it is just—the assumption is we are going to do this study, so I am going to plow ahead.

Dr. ANASTAS. There are two things that I would like to say. One is when concerns are raised to this Congress and Congress urges the EPA to undertake a study, we take that seriously, and I think that we all have a bias toward wanting more information out there.

The second thing that I think answers your question directly is that you can't find what you are not looking for, and so how we thoughtfully construct a study that Congress urged us to do to ensure that we find out whether or not these concerns are valid and to what degree, I think that that is incumbent upon us when we are urged to do it by this Congress.

Chairman HARRIS. The one thing I asked at the very beginning is forgetting the urging to do by Congress. As a scientist, 1.2 million applications of a technology.

Dr. ANASTAS. You can't——

Chairman HARRIS. Is there a justification for spending monies to do that study as a scientist?

Mr. MILLER. Mr. Chairman, I am really not persnickety about the rules, but the conduct of this hearing does not even resemble anything provided for in the House rules. Mr. Tonko did not yield you his 40 seconds.

Mr. ROHRABACHER. Let me note for my——

Chairman HARRIS. Recognize the gentleman from California.

Mr. ROHRABACHER. I have been the chairman, having been the chairman of various subcommittees that you are absolutely wrong in your reading of the House rules, because those may have been the House rules before, but it is the prerogative of the chairman

of a subcommittee as to how he will conduct that subcommittee hearing. I have been in many subcommittees where the chairman went on for 10 minutes in order to get a straight answer from a witness.

Chairman HARRIS. Well, thank you, and look. I will end because this is the problem. We are blending politics with science. That is the disappointment.

I recognize the gentleman from Maryland for five minutes.

Mr. BARTLETT. My question has to do with the same commonsense that the Chairman is talking about.

We have a little community in western Maryland, George's Creek. By the way, in Maryland MDE acts instead of EPA, and that is because they are at least as stringent as EPA, so that—EPA lets them act.

The effluent from the sewage treatment plant at George's Creek was a little bit out of bounds, and so they had to put in a new treatment plant. That was enormously expensive. This is a very small, very poor community. The state gave them all the grants that legally they could give them and still it was a huge financial burden on the community. All three county commissioners lost their last—their next election over it.

Trying to negotiate with MDE over this that the juice wasn't going to be worth the squeezing was like trying to talk the fly out of snatching the—the toad out of snatching the next fly. That wasn't going to happen. They were totally mindless.

George's Creek is hundreds of miles from the bay, and the river enters in where the bay empties into the ocean. It is going to be little or no effect to this. There were many other better places to spend that money than forcing George's Creek into this.

Where does commonsense enter in? Clearly that money could have been better spent somewhere else than at George's Creek, but there was no negotiating with these people, and there are many regulations that you might have that will cause such an economic burden that the money might be better spent somewhere else in our society.

How do you make these commonsense decisions?

Dr. ANASTAS. One of the things that I would like to say about making commonsense decisions or decisions about science is that politics cannot, will not, and must not enter into scientific decisions. Politicizing science is antithetical to everything I am and everything that I do.

When we engage in scientific studies with the hydraulic fracturing study being discussed today, we have engaged scientific experts from all walks of life, from industry, from academia. We have engaged thousands of people from the public to ensure that this scientific study will be objective. We will not presuppose the results of this scientific study one way or the other.

Mr. BARTLETT. Sir, I think the chairman's concern is that if there had been 1.2 million frackings and there is zero evidence of any groundwater contamination, any aquifer being contaminated, why would it be commonsense to spend any money on a scientific study? Aren't there other places we can better spend our money?

Dr. ANASTAS. I believe that with an endeavor of the importance of hydraulic fracturing . . .

Mr. BARTLETT. But we have done it 1.2 million times and no evidence of any contamination. Isn't there better places we might spend our money than scientific—I am a scientist. I spent a whole lot of my life doing that, so I understand science.

Dr. ANASTAS. The level of concern that has been raised by the public needs to be addressed as recognized by this——

Mr. BARTLETT. But how can the public have a concern when there are zero evidences of contamination after 1.2 million fracking operations?

Dr. ANASTAS. I have to repeat that you can't find something if you don't look, if you don't ask the questions, if you don't do the science. That is why we do science, to answer the questions, to address the concerns. So one way or the other objectively we can state what the current state of affairs is.

Mr. BARTLETT. You don't think that there is some validity in observing that 1.2 million fracking operations that have not produced any evidence of water contamination, you don't think that that is relevant?

Dr. ANASTAS. I think all data is relevant. All objective, scientifically-credible data is relevant. The absence of data is not proof of anything. We construct scientific studies to get data that we can turn into information, that we can turn into knowledge. That is what the scientific——

Mr. BARTLETT. Let me ask you a question. If you go to the communities where we have had these 1.2 million fracking operations and you ask them, has there been any water contamination, and they tell you, no, so is that not a reasonable scientific investigation?

Dr. ANASTAS. It is exactly because we have gone out and asked have there been contaminations, and when people say the answer is yes, part of this study is to validate whether or not that is true, whether or not that has happened.

Mr. BARTLETT. But it is my understanding that there has been no documented evidence of contamination with 1.2—who says there has been contamination if that is not documented?

Dr. ANASTAS. It is the documentation or lack of documentation that we seek. If somebody reports that there has been contamination, that needs to be scientifically validated.

Mr. BARTLETT. I hope that is the most urgent place to spend your money. I doubt that it is.

Thank you, Mr. Chairman. I yield back.

Chairman HARRIS. Thank you very much, Mr. Bartlett.

Mr. McNerney, the gentleman from California, is recognized for five minutes. Thank you.

Mr. MCNERNEY. Thank you, Mr. Chairman. Thank you to the panel for coming here today.

The EPA is a large organization, it has a lot of different laboratories, the statutes haven't been changed for a long time. There is no doubt in my mind that there is room for improvement. There is possible duplication, there is possible processes that could be improved, and so on, and I think that is an important function that this Subcommittee should be going after, and yet, nothing in this hearing today from the other side has been helpful in that stated

goal of this hearing, to gain an understanding of the best ways to reorganize and reauthorize the ORD.

So moving forward, Mr. Elkins and Mr. Trimble had a fairly good list of suggestions that they claimed have not been implemented by the ORD. So, Mr. Elkins and Mr. Trimble, is it your opinion that this is being resisted, that these changes are being resisted, or are there statutory or resource limitations that are keeping these suggestions from being implemented?

Mr. ELKINS. Actually, the reports that we have issued to ORD for the most part they have been responsive to our recommendations. We have, you know, we have had a few recommendations such as the endangerment finding, we are still waiting a response back from, but generally speaking they have been responsive.

Mr. MCNERNEY. So the impression I had earlier in your testimony was that they weren't being responsive, but what I am hearing now is, yes, the recommendations are being listened to, and they are being responded to as the agency has the capability to respond.

Mr. ELKINS. Generally speaking I think that would be accurate——

Mr. MCNERNEY. Thank you. Mr. Trimble.

Mr. TRIMBLE. I think EPA has generally been agreeable to our recommendations, taking a very positive approach to this. The one area where I think we have a disagreement is concerning the recommendation about establishing a top science official for EPA to manage all the science activities.

As I noted in my opening comments their proposal to add additional responsibilities to the science advisor I think is probably going to be problematic. We will track that, but as I noted the NRC back in 2000 when they were tracking the same issue stated in their report that they had underestimated the size of the challenge that would be faced in coordinating science activities across the agency, and they explicitly noted the challenge of dual heading the chief of ORD with this responsibility. And much of what they focus on is to corral all the sort of three types; the programs, the regions, and ORD, you need somebody with authority. In a bureaucracy that means management and budget in reality to make things happen and to knock heads and make——

Mr. MCNERNEY. I mean, that sounded like a good recommendation. Do you think there is a statutory limitation that is preventing that from happening, or is there just some resistance within the department? What is your——

Mr. TRIMBLE. I know in the NRC's recommendation it requested that go forward with a second deputy, which I believe would require action by the Hill. We didn't recommend that it go that far, but we recommended that it be a senior person above all the labs. Whether or not EPA could do that on its own I suspect they could, but that is not something we have delved into.

Mr. MCNERNEY. Okay. Thank you. Now, what has suffered from these problems that you all have found? Is it the quality or the quantity? What has been the negative fallout from those deficiencies?

Mr. ELKINS. Well, I think it depends on the report. You know, it depends on the area that we have looked at, but generally speak-

ing, for instance, on the workload issues and the workforce planning, position management, the issue there is not being able to estimate exactly what your workload is, and therefore, not being able to determine what human resources you need to address those issues or the specialties that you need on staff. That is an issue.

The other issue that has come up in other studies has to do with data quality, which relates to the information coming in whether it is reliable and whether or not there are systems and procedures in place to make sure that it is reliable.

These are the types of concerns and questions that have come up through the reports that we have done.

Mr. TRIMBLE. What I would highlight specifically to this top science official, I would just go back to the NRC report that noted that the lack of a top science official is a formula for weak scientific performance and poor scientific credibility. So I think you have this over-arching effect.

More specifically, you have potentially lost opportunities for collaboration, for consolidating resources, you know, especially with the tight budgets in terms of workforce and workload and facilities. You miss opportunities to leverage that.

And then without the data on workload and workforce, you are not in a position to know whether you have got the right people at the right place doing the right thing.

Mr. MCNERNEY. Okay. Then, again, this may be a statutory issue. It may not—it may be that the EPA doesn't have the authority to create that position on its own.

I yield back.

Chairman HARRIS. Thank you very much.

I would now recognize the chairman of the committee, Mr. Hall from Texas, for five minutes.

Chairman HALL. Thank you, sir.

Dr. Anastas, I would like to raise a few concerns about EPA's study of the relationship between hydraulic fracturing and water. We have had a lot of testimony here, and basically the testimony has been that there is just no way in the world that the testimony you and others from your department have given could be true. And I want to ask you in response to questions I sent to you for the record from hydraulic fracturing hearing in May, you responded on September 23 that all aspects of this research would have, and I quote, this is your quote, "an associated quality assurance project plan" which has been "reviewed and approved prior to the stated data collection."

However, your agency started testing and data collection before the final study plan was done.

My question is were specific project plans completed and subjected to public comment and external peer review prior to testing and prior to the release of the full final study plan? Yes or no?

Dr. ANASTAS. A quality action project plan is not——

Chairman HALL. I didn't ask you that. Just give me a yes or no answer to the question I asked you. I don't want a lecture from you.

Dr. ANASTAS. The quality action project plans are reviewed by experts both internally and externally.

Chairman HALL. Were they reviewed?

Dr. ANASTAS. They were reviewed.

Chairman HALL. Well, that is what I asked you. Were specific project plans completed and subjected to public comment and external peer review prior to testing and prior to the release of the full final study plan, and your answer——

Dr. ANASTAS. The review process——

Chairman HALL. —to that is yes. Is that right?

Dr. ANASTAS. No. The answer is that they were externally and internally reviewed. The process by which they go through that review is different from that of the full project protocols and plan.

Chairman HALL. Do you consider this study, "a highly influential scientific assessment?"

Dr. ANASTAS. That determination has not been made.

Chairman HALL. Why do you think it hadn't been made?

Dr. ANASTAS. I can tell you that it has not been made but—and that it certainly will be a decision that we will—and a determination that we will make.

Chairman HALL. Do you think it doesn't meet the threshold?

Dr. ANASTAS. That determination has not been made.

Chairman HALL. Mr. Elkins, in your opinion do you think the hydraulic fracturing study should be considered a highly-influential scientific assessment?

Mr. ELKINS. Sir, we really haven't taken a look at that particular issue, so I am not in a position to comment.

Chairman HALL. Okay. E&E News reported that EPA has abandoned its announced study protocols in order to, "release more of its findings in 2012." Can I get any assurance that the committee—can you give the committee any assurance that this target release date is not politically driven?

If so, what is the difference between releasing findings in the late 2012 versus, say, early 2013?

Dr. ANASTAS. I can give this committee complete assurance that the release of data is not politically driven.

Chairman HALL. I have one last question. Do I have a little time left?

Chairman HARRIS. Yes, you do, Mr. Chairman.

Chairman HALL. Mr. Trimble and Mr. Elkins, your offices have been critical of EPA's process for selecting impartial scientific advisory panels. Can you describe the problems that you have incurred in the agency's handling of external peer review panels and what can be done to prevent EPA from stacking the panels?

Mr. ELKINS. Well, yes, sir. In the one report that we have done that addressed that specifically, again, that I believe we did back in 2009, the specific issue was whether or not the Agency had systems in place to identify any conflicts of interest. At that time we found that the system wasn't robust enough to make those sorts of determinations, but since we brought that to the agency's attention, they have addressed that, and in their current peer review handbook it does address, you know, our concerns.

Chairman HALL. I thank the gentlemen. I yield back.

Chairman HARRIS. Thank you very much.

I just want to—before we break up I want to thank the witnesses for their valuable testimony, all the Members for their questions. To provide a brief clarification for Dr. Morgan's letter for the

record, unfortunately Dr. Morgan was unable to confirm his video attendance at this hearing until 5 hours after the deadline for testimony to be submitted. We are happy to include his comments in letter form as we have accepted and look forward to working with all members of the scientific community in the future.

The Members of the Subcommittee may have additional questions for the witnesses, and we will ask you to respond to those in writing. The record will remain open for two weeks for additional comments from Members. The witnesses are excused. The hearing is adjourned.

[Whereupon, at 4:02 p.m., the Subcommittee was adjourned.]

Appendix I:

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by DR. Paul Anastas,
Assistant Administrator,
Office Of Research And Development,
U.S. Environmental Protection Agency;

Questions Submitted by Chairman Andy Harris

QUESTION 1: As it relates to GAO's lab management report, the Committee has not seen a copy of the letter that EPA was required to submit to GAO, OMB, and Congress regarding actions taken or planned in response to the GAO findings and recommendations.

a. Has EPA submitted this letter?
b. What actions does EPA plan to take in response to the GAO recommendations?

ANSWER:

a. Yes. EPA Chief Financial Officer signed and transmitted original versions of the letter to GAO, Congress, and OMB on November 16, 2011.

b. **GAO Recommendation**

The Administrator of the EPA should develop an overarching issue-based planning process that reflects the collective goals, objectives, and priorities of the laboratories' scientific activities.

EPA Response.

The EPA agrees with the GAO that more can be done to develop a planning process that better reflects the collective goals, objectives, and priorities of the scientific activities across its laboratory enterprise. The EPA will consult with stakeholders and oversight entities, as appropriate to determine the best approach to develop an overarching planning process and system that "reflects the collective goals, objectives, and priorities of the laboratories' scientific activities," described in this GAO recommendation.

GAO Recommendation.

The Administrator of the EPA should establish a top-level science official with the authority and responsibility to coordinate, oversee, and make management decisions regarding major scientific activities throughout the Agency, including the work of all program, regional, and research laboratories.

EPA Response.

The EPA agrees with the underlying principle and objectives of this GAO recommendation. Congress considered two bills in 2001 to establish a deputy administrator of science and technology at the EPA — and neither bill was enacted.

In response to the GAO recommendation, the EPA will expand the authority and responsibility of the Science Advisor to coordinate, oversee, and make recommendations to the Administrator regarding major scientific activities throughout the Agency, including the work of all program, regional, and ORD laboratories.

In considering the best structure to accomplish the objectives in this GAO recommendation, the EPA recognizes that the management of its laboratory enterprise must help the enterprise adapt to significant external pressures. These pressures create a demand for:

1. Solutions to complex, interdependent, and dynamic *systems problems* for many of the EPA's clients across the nation;

2. Interdependence and a high level of knowledge sharing — with many clients, in many regions, at many geographic and temporal scales, and in many communities across the nation;

3. Sharing resources — including shared facilities that are more efficient and sustainable, shared expertise and human resources, and shared equipment and supplies

4. Responding proactively to declining financial resources and to increasing mandates for energy-efficient and sustainable facilities.

GAO Recommendation

The EPA Administrator should improve physical infrastructure and real property planning and investment decisions by managing individual laboratory facilities as part of an interrelated portfolio of facilities.

EPA Response.

The EPA notes that its annual Buildings and Facilities (B&F) *call letter* process allows the Agency to manage laboratory facilities as an interrelated portfolio. In the *call letter* process, the EPA collects and prioritizes all facility project requests independent of the requestor, according to the mission of that Program or Region, and the Agency's priorities and strategic plans. The projects are first reviewed to balance the mission, programmatic, and legislative requirements the EPA must weigh when allocating its limited resources. The projects are then evaluated against Agency and industry standards for health and safety, environmental compliance, infrastructure requirements, such as Green building requirements, and energy reduction goals. The results of this

process form an annual capital spending plan that effectively allocates limited resources on a portfolio- and Agency-wide basis.

The EPA agrees with the GAO that more can be done to strengthen its master planning process, which the Agency believes overall has kept the EPA's 35 laboratories and 68 laboratory support buildings in good condition. As the GAO points out, the EPA's internal real property asset management plan states that facility master plans are supposed to be updated every five years to reflect changes in facility condition and mission. Projects identified through the master planning process and implemented through the B&F *call letter* process described above are taking longer to complete (six to ten years) than the originally anticipated (five years). This forms the basis of the EPA's position that the master plans need to be updated as required, to reflect mission or condition changes not on any set timeline. Over the next three to five years, the Agency plans to upgrade and streamline the master planning process, update the plans as required, reinforce the current master planning portfolio perspective, and strengthen the ties between the current annual and five-year B&F *call letter* process and the master plans.

GAO Recommendation

The EPA Administrator should improve physical infrastructure and real property planning and investment decisions by ensuring that master plans are up-to-date and that analysis of the use of space is based on objective benchmarks.

EPA Response.

The EPA agrees with the GAO that the Agency's master plans must be up-to-date and include effective benchmarks and metrics. As noted above, the GAO points out that the EPA's real property asset management plan states that facility master plans are supposed to be updated every five years to reflect changes in facility condition and mission. As part of our plan to upgrade the master planning process, the EPA intends to revise this guidance to ensure that the master plans are updated as required to reflect mission or condition changes versus a timeline, even if this occurs on a more frequent basis than the current five year guidance. As the GAO points out, almost 50 percent of the EPA's Master Plans have been updated to reflect changing mission or infrastructure needs. Some examples are: the Cincinnati laboratory five-phase infrastructure replacement project, the Research Triangle Park laboratory consolidation; and the Region 10 laboratory modernization.

The space conditions and utilization metrics identified in the master plans are updated annually by the facility managers as part of the Federal Real Property Council process and validated through audits. Objective benchmarks for laboratory usage are employed when the laboratories are of sufficient size to establish a valid baseline; most of the

EPA's laboratory facilities, however, are small and have specific functional requirements for each lab module. The functional requirement establishes the need for the space allocation rather than the population of the laboratory.

As the EPA continues to upgrade its master planning process, the Agency will continue to work with other federal agencies and industry associations to define relevant laboratory benchmarks. As a rule, the Agency already uses benchmarks for the square footage of a typical laboratory module. The Agency uses industry averages, national guidelines, and comparable Agency references to determine laboratory space and operating costs. Once benchmarks are updated and proven valid, the Agency will include the benchmarks in its master plans.

GAO Recommendation

The EPA Administrator should improve physical infrastructure and real property planning and investment decisions by improving the completeness and reliability of operating-cost and other data needed to manage its real property and report to external parties.

EPA Response.

The EPA agrees with the GAO that the Agency's operating metrics should be updated. As stated above, as the EPA continues to refine the master planning process, the Agency will work internally to upgrade and validate its internal operating costs and other metrics. The EPA agrees that reliable data are needed to manage its laboratory enterprise effectively. Beginning in FY 2011, the Agency added coding to track operating costs at program-funded laboratory facilities that were not previously tracked. The Agency will review options for improving data reliability and completeness for the remaining labs within its laboratory enterprise.

GAO Recommendation

The EPA Administrator should develop a comprehensive workforce planning process for all laboratories that is based on reliable workforce data and reflects current and future Agency needs in the overall number of federal and contract employees, skills, and deployment across all laboratory facilities.

EPA Response.

The EPA agrees with this recommendation and recognizes that opportunities exist to improve workforce planning procedures for its laboratory enterprise. The EPA will develop a comprehensive workforce planning process for its laboratory enterprise as part of a broader Agency workforce planning process. The comprehensive workforce planning process for EPA laboratories will be based on information about

1. The EPA's priority needs for mission relevant laboratory science

2. Laboratory functions and systems required to meet these needs and to transform laboratory outputs into results that contribute to Agency decisions

3. Workforce skills and disciplines required to sustain each laboratory and the Agency's portfolio of laboratories — including capability and capacity — across the scope of the Agency's functions, systems, programs, and facility lifetime.

Collectively, these three components define a framework for comprehensive laboratory workforce planning.

In FY 2012, the EPA plans to strengthen its existing strategic workforce planning process by integrating workforce planning with its annual budget process. The Agency will annually assess if its workforce has the skills to meet the nation's environmental priorities today and in the future. Each regional office and headquarters program office will consider the EPA's Strategic Plan and Administrator's priorities to establish their optimal workforce based on needed occupations. By using planned FTE resource levels for FY 2012 and proposed resource levels for FY 2013-2015, each office, including laboratories, can better identify potential skill and workforce gaps. Overall, these efforts will strengthen succession planning efforts, lead toward improved strategic recruitment and outreach efforts, and ensure office position management, staffing, and hiring decisions are aligned to mission success.

GAO Recommendation

If the EPA Administrator determines that another independent study of the EPA laboratories is needed, then the Agency should include (within the charge questions for this study) alternate approaches for organizing the laboratory workforce and infrastructure. These alternate approaches should include options for sharing and consolidation.

EPA Response.

The President has requested funds to begin a long-term study of the EPA's laboratory enterprise in FY 2012. If funded, this long-term study will be conducted by an independent expert committee of the National Academy of Sciences (NAS). When the NAS committee prepares its design for the long-term study, the EPA will request that NAS consider information in this GAO report and alternate approaches for organizing the workforce and infrastructure of the EPA's laboratory enterprise.

Both President Obama and EPA Administrator Jackson have emphasized that science must be the backbone for the EPA's programs and decisions. As GAO indicated in its report, knowledge and technical information from the Agency's laboratories, scientists, and partners are more important than ever to inform decisions that protect our nation's environment and human health.

QUESTION 2: GAO, NAS, and other independent evaluations have recommended that the EPA establish a top-level science official with the authority and responsibility to coordinate, oversee, and make management decisions regarding major scientific activities throughout the Agency; including the work of all its laboratories. What are the EPA plans for implementing this recommendation?

ANSWER:
In response to the GAO recommendation, the EPA will expand the authority and responsibility of the Science Advisor to coordinate, oversee, and make recommendations to the Administrator regarding major scientific activities throughout the Agency, including the work of all program, regional, and ORD laboratories.

QUESTION 3: GAO's report states that EPA does not use objective criteria for determining whether its laboratory facilities are fully utilized and that the Agency does not know how much it costs to operate these facilities.

a. How does EPA rationalize or justify the need for EPA's existing laboratory infrastructure without this information?
b. Has EPA evaluated whether the investment of additional resources into its aging laboratory is worthwhile? Wouldn't it make more sense to consolidate laboratory locations and concentrate resources into fewer buildings or into hiring more staff or conducting research?

ANSWER:
The EPA will use the funding ($2M) in the FY 2012 appropriation to conduct a long-term study of the EPA's laboratories.

With regard to the questions about the use of objective criteria for laboratory facilities, the space conditions and utilization metrics identified in EPA master plans are updated annually by the facility managers as part of the Federal Real Property Council (FRPC) process and validated through audits. The functional requirement establishes the need for the space allocation rather than the population of the laboratory.

Over the next three to five years, the Agency plans to upgrade and streamline the master planning process; update its plans as required; reinforce the current master planning portfolio perspective; and strengthen the ties between the current annual and 5-year B&F *call letter* process (described below) and the master plans.

EPA facility master plans are revised periodically to reflect changes in facility condition and mission—including the feasibility of investing additional resources in existing facilities. As

GAO points out, the EPA's facility master plans are supposed to be updated every 5 years to reflect changes in facility condition and mission. The EPA intends to revise this guidance to reflect mission or condition changes, even if this occurs on a more frequent basis than the current five year guidance.

The EPA notes that the draft GAO report did not take into account the Agency's annual Buildings and Facilities (B&F) *call letter* process; projects implemented through the B&F *call letter* process take longer to complete (6-10 years) than the originally anticipated (5 years). In this process, each project is prioritized by the Programs and Regions to ensure that it is aligned with the mission of that Program or Region, and meets the Agency's priorities and strategic plans. The projects are first reviewed to balance the EPA's mission, programmatic, and legislative requirements, and are then evaluated against Agency and industry standards for health and safety, environmental compliance, infrastructure requirements, and energy reduction goals. The results of this process form an annual capital spending plan that effectively allocates limited resources on a portfolio and Agency-wide basis. The master plan projects can only be completed as funding becomes available; this forms the basis of the EPA's position that the master plans need to be updated as required, not on a set timeline.

QUESTION 4: Many EPA science activities are housed within regulatory offices. For example, EPA's Office of Air and Radiation manages the National Fuel and Vehicle Emissions Laboratory, as well as the National Air and Radiation Environmental Laboratory.

a. Please explain the origin and reasons for this structure, which would seem to present a conflict of interest with regulators managing and directing the work of scientists.
b. How does EPA organize its science activities to be insulated from regulatory influences and ensure it remains objective and unbiased?

ANSWER:

a. At the EPA's founding, the Agency inherited 183 buildings at 84 sites in 26 states. Forty-two sites consisted of laboratories. The EPA's mission and decision needs required a laboratory enterprise with three distinct laboratory organizations: research, program, and regional laboratory organizations. Each of the EPA's three laboratory organizations has different objectives and responsibilities with respect to the EPA's mission—

    - *Research* laboratories have primary responsibility for research and development – developing knowledge, assessments, and scientific tools that form the underpinnings of many of EPA's risk assessments and risk management decisions.
    - *Program* laboratories have primary responsibility for implementing legislative mandates to develop and implement specific programs to support regulatory

implementation, compliance, and enforcement at a national level—e.g., motor vehicle standards testing, pesticide registration.

- *Regional* laboratories have primary responsibility for providing scientific data in support of the Region's environmental programs, including informing immediate and near-term decisions on environmental conditions, compliance, and enforcement.

These different objectives and responsibilities create needs for different and distinct laboratory functions, facility systems, and even architectural and engineering requirements—between individual laboratories and between laboratory organizations. The Agency's three laboratory organizations interact with each other, with partners in the EPA's national regulatory and regional programs, and with scientists in academia, other federal and state agencies, and industry.

b. The nature of scientific information and how it fits within the context of Agency decision-making determines the role and use of EPA laboratory science. Strong independent science is of paramount importance to decisions about our nation's environmental policies. The quality of the laboratory science that underlies the EPA's protective standards is vital to the credibility of EPA decisions and ultimately to the Agency's effectiveness in protecting the environment and human health.

For these reasons, the role and use of EPA laboratory science are guided by the policies and procedures of the "U.S. Environmental Protection Agency Peer Review Handbook 3rd Edition," (EPA/100/B-06/002, available at www.epa/gov). The third edition of this EPA handbook incorporates the provisions of the OMB Final Information Quality Bulletin for Peer Review that was issued to help agencies enhance their peer review accountability and transparency for all scientific activities, including influential scientific information and highly influential scientific assessments.

The EPA also supports review of the design and results of some laboratory scientific activities at the program-project level; these reviews are conducted by committees of independent experts chartered under the Federal Advisory Committee Act.

QUESTION 5: How does EPA determine where to spend its science and technology dollars? Please describe EPA's protocol for determining research priorities.

ANSWER:

The EPA's scientific and technical needs are identified through close and continual dialogue with the EPA's Programs and Regions as well as through input from the Science Advisory Board (SAB). Our science and technology investments are focused on relevancy and responsiveness to the Agency mission and program priorities, and addressing important problems or critical

technical barriers to protecting human health and the environment. The EPA's scientific and technical needs are identified through close and continual dialogue with the EPA's Programs and Regions.

To ensure our research meets the Agency's research needs and supports timely and mission-relevant outcomes, we have developed the following protocol for determining research priorities:

- National (research) Program Directors (NPDs) meet with program and regional office leads to identify research priorities.
- Once a budget is developed, reviews with each Program Office are held, on a quarterly basis, to ensure a mutual understanding of priorities, products, and deliverables.
- In addition, ORD research will be included in a database that will allow ORD, Programs, and Regions to monitor activities, milestones, products, and outcomes to provide a basis for making strategic decisions on future priorities, resources, and staffing.

After the Budget is released, research priorities are also reviewed by the EPA's external national advisors, the Board of Scientific Counselors (BOSC) and the SAB. The SAB focuses on ORD research priorities and strategic directions. The BOSC is focused on research implementation guidance.

QUESTION 6: With respect to EPA's annual budget, please answer the following questions.

a. What is the split between the amount of funding spent on basic research and amount spent on applied research?
b. Please detail how much science and technology funding supports each of the following environmental statutes:
    1. Clean Air Act
    2. Federal Water Pollution Act
    3. Safe Drinking Water Act
    4. Comprehensive Environmental Response, Compensation, and Liability Act
    5. Resource Conservation and Recovery Act
    6. Oil Spill Pollutions Act
    7. Toxic Substances Control Act
    8. Pollution Prevention Act
    9. Global Change Research Act

ANSWER:

The EPA does not budget by statute, although research activities under certain appropriations are designated to advance the EPA's authorities under specific statutes (such as the research component under the Inland Oil Spills appropriation which advances OPA responsibilities and the S&T Transfer under the Superfund appropriation which advances CERCLA responsibilities).

Today's increasingly complex public health and environmental problems require an approach that supports innovation that leads to transformational solutions, for example, research that goes beyond studying single chemicals or narrowly defined problems. Throughout the last year, the EPA worked extensively to realign its research programs to ensure all of our activities reflect an integrated, transdisciplinary approach. Our goal is to find and apply sustainable solutions through innovation. To do that effectively, our efforts will be driven based largely on how the results will be applied to solving human health and environmental problems.

QUESTION 7: Most modern environmental problems are multi-media issues. Many of the relatively simple environmental problems that were air or water specific have largely been addressed. Many of the remaining and emerging environmental challenges are significantly more complex. Please describe how EPA S&T considers and incorporates the complex nature of these multi-media issues into its planning and management decisions.

ANSWER:

Modern environmental problems are indeed multi-media, and the EPA has positioned its research programs to reflect the interdependency of environmental problems. Because the nature of environmental and human health issues has become more complex, our research planning and management approaches are implementing systems thinking and integrative approaches that complement our traditional single discipline approaches. In all aspects of our work, from problem identification and definition, to research design, conduct and implementation, the EPA's national research programs involve the widest span of scientific and technical disciplines as well as needs of EPA's Programs and Regions, so that diverse perspectives are collaboratively brought to bear on today's complex, multi-media environmental problems.

QUESTION 8: What protocols guide EPA's determination of whether or not a study is a highly influential scientific assessment? Given that there are protocols for data collection required of a study that received this classification that are not required for influential scientific information, how is EPA determining what protocols to follow when collecting data for its study on hydraulic fracturing? How is EPA undertaking data collection if it does not know whether the study will be subjected to peer review as a highly influential scientific assessment?

ANSWER:

The EPA has guidelines for implementing the Information Quality Guidelines (http://www.epa.gov/quality/informationguidelines/documents/EPA_InfoQualityGuidelines.pdf), which we developed to be consistent with the Office of Management and Budget's Information Quality Guidelines. These guidelines provide agency personnel with guidance to help determine whether or not a study is likely to be considered a highly influential scientific assessment. This guidance, along with *OMB's Final Information Quality Bulletin for Peer Review* and agency documents, including the Data Quality System document

(http://www.epa.gov/quality/qa_docs.html) and the Peer Review Handbook (http://www.epa.gov/peerreview/pdfs/Peer%20Review%20HandbookMay06.pdf), provide information on data collection and peer review requirements for various types of investigations. The EPA has designated the 2012 and 2014 study reports on hydraulic fracturing as "highly influential scientific assessments"; therefore, they will undergo rigorous independent peer review.

QUESTION 9: E&E News reported on EPA's premature collection of data for its fracking study prior to completion of its study plan. Specifically, the report said "EPA is downplaying concerns about the early data collection, saying it was necessary to 'provide a foundation for the full study' and will allow for the agency to be able to release more of its findings in 2012 instead of the final 2014 study deadline." In response to a question about the factors driving EPA's decision to initiate premature data collection in order to release more findings in 2012, you assured that this decision was not politically driven. What is the significance of and reason for EPA's 2012 target release date, and what is the difference between releasing findings in late 2012 versus early 2013?

ANSWER:

The EPA's hydraulic fracturing study has important implications for a wide range of stakeholders. From the time the EPA submitted the initial scoping document for the study to the Science Advisory Board (SAB) in March, 2010, the Agency has indicated its intent to have preliminary results available by late 2012 and the full report by late 2014. The 2012 date was determined to be an important juncture in the progress of the study – a date that was highly responsive to the public and Congress, and that could be met without compromising the Agency's absolute commitment to transparency and rigorous quality assurance procedures. The EPA has vigorously communicated its plans for all activities that will be described in the 2012 and 2014 reports with all stakeholders since the earliest days of the development of the study plan. Of course, any information disseminate in 2012 will be preliminary, as stated above, and will be treated as such in any agency decision making on hydraulic fracturing.

Consistent with section 2.5 of the EPA's requirements for Quality Assurance Project Plans, the Agency's "...shall be reviewed and approved by an authorized EPA reviewer to ensure that the QA Project Plan contains the appropriate content and level of detail. The authorized reviewer, for example the EPA project manager1 with the assistance and approval of the EPA QA Manager or by the EPA QA Manager alone, are defined by the EPA organization's Quality Management Plan. In some cases, the authority to review and approve QA Project Plans is delegated to another part of the EPA organization covered by the same Quality Management Plan."

QUESTION 10: EPA recently announced in the Federal Register that it will be launching a standing committtee of its Science Advisory Board to review Integrated Risk Information System or IRIS Assessment.

a. Will you suspend all current and pending IRIS assessments until this panel is able to review them?

b. You have stated that this panel will be "similar to the Clean Air Science Advisory Committee." We have received significant recent testimony on imbalances and the lack of independence of this group, with one former member calling the process "flawed, narrow, and possibly ethically questionable. Can you guarantee that non-academic and non-governmental scientists will be welcomed on this panel? What steps are being taken to ensure that the panel is "fairly balanced in terms of the points of view represented"?

c. The Clean Air Science Advisory Committee was required by Congress in the 1990 Clean Air Act Amendments. Under what authority is EPA establishing this standing body, and what steps have been taken to comply with Federal Advisory Committee Act notification requirements?

ANSWER:

a. No. The EPA has no plans to suspend the IRIS Program and will incorporate the NAS recommendations in a phased-in approach, although we will closely review each ongoing IRIS assessment to ensure they are of the highest possible scientific quality, using a transparent process that includes rigorous peer review. Independent rigorous external peer review is a cornerstone of the IRIS process. The EPA ensures that every IRIS assessment undergoes external peer review that is open to the public. The SAB Chemical Assessment Advisory Committee will provide peer review for selected IRIS assessments, and advise the EPA on improvements to the IRIS process as it implements recommendations from the National Academy of Sciences.

b. The SAB Chemical Assessment Advisory Committee will not be an independent chartered federal advisory committee such as the Clean Air Scientific Advisory Committee. Rather, the Chemical Assessment Committee will be a *subcommittee* of the SAB, an existing independent chartered federal advisory committee. Members of the SAB Chemical Assessment Advisory Committee, appointed by the EPA Administrator, will serve as a core of experts to provide ongoing advice, through the chartered SAB, to improve the EPA's IRIS process. The SAB will provide advice on the IRIS process, just as the Clean Air Science Advisory Committee advised the EPA in developing the new National Ambient Air Quality Standards process.

As chemical-specific IRIS reviews are identified, the SAB Staff Office will augment the expertise on the SAB Chemical Assessment Advisory Committee with additional experts, as required, to form *ad hoc* panels. (This is similar to how the SAB Staff Office augments the CASAC with additional experts to form CASAC panels for different Clean Air Act criteria pollutants subject to National Ambient Air Quality Standards.) This process is known as panel formation. The SAB panel formation process will provide an opportunity for public nomination

of experts for panels and public comment on experts being considered for panel membership. The SAB panel formation process strives to meet the Federal Advisory Act requirement that advisory panels be "fairly balanced in terms of the points of view represented." The EPA SAB Staff Office will seek a wide pool of experts from different sectors who are free of both financial conflicts of interest and an appearance of a lack of impartiality. We are confident that non-academic and non-governmental scientists will be able to meet these criteria and participate on such panels.

c. The new SAB subcommittee, the SAB Chemical Assessment Advisory Committee, will not be established under the Clean Air Scientific Advisory Committee. Rather the new subcommittee will be established as a standing subcommittee of the SAB, as announced in the Federal Register on November 18, 2011 (76 FR 71561-71562). That Notice cited the Congressional mandate for the SAB, established in 1978 by the Environmental Research, Development and Demonstration Act (42 U.S.C. 4365) to provide independent advice to the Administrator on general scientific and technical matters underlying the Agency's policies and actions. The Notice requested public nominations of experts by January 6, 2012.

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Subcommittee on Energy & Environment

Hearing Questions for the Record
The Honorable Randy Neugebauer

"Fostering Quality Science at EPA: The Need for Common Sense Reform"
Thursday, November 17, 2011

QUESTION 1: For an agency that publicly prides itself on being science-driven and making sound, evidence-based decisions, it is interesting to me that the EPA's press release in response to the Inspector General's findings was so flippant. If the Agency were so concerned with scientific integrity and validity, I would think it would take any implications of unsatisfactory conduct very seriously and consider making legitimate changes to address those problems. Could you please explain why the Agency was so nonchalant about the unbiased recommendation that you improve your peer review process and scientific assessments? Does the EPA have any plans to implement any or all of the Inspector General's recommendations?

ANSWER:

Despite our disagreement with many of the Office of the Inspector General's findings in their report entitled *Procedural Review of EPA's Greenhouse Gases Endangerment Finding Data Quality Processes*, we feel it was an important report, and have seriously considered their recommendations. Peer review is an integral component of the EPA processes for developing science information, and we are always interested in making improvements that promote greater transparency. Thus, the EPA is developing a plan that addresses the OIG's recommendations.

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
Subcommittee on Energy & Environment

Hearing Questions for the Record
The Honorable Brad Miller

"Fostering Quality Science at EPA: The Need for Common Sense Reform"
Thursday, November 17, 2011

Role of the EPA Science Advisor

QUESTION 1: Dr. Anastas, as the EPA Science Advisor, how are you limited in your authority over the research agency-wide?

ANSWER:

The EPA Science Advisor has a dual role as Assistant Administrator for Research and Development. The EPA will expand the authority and responsibility of the Science Advisor to coordinate, oversee, and make recommendations to the Administrator regarding major scientific activities throughout the Agency, including the work of all program, regional, and ORD laboratories.

EPA Science Advisory Board

QUESTION 2: The EPA Science Advisory Board (SAB) provides expert advice on scientific and technical matters within the Agency. Dr. Anastas, ORD frequently requests SAB to review research plans and its proposed allocation of ORD resources each year. How does the ORD decide which scientific and technical matters to ask the SAB to review?

ANSWER:

The EPA's Science Advisory Board (SAB) is an important resource for the Office of Research and Development (ORD). The SAB plays a significant role in advising ORD on the overall strategic direction of our research, as well as the strategic direction of the individual research programs. This advice is obtained in part through the SAB's annual review of the budget request. As necessary, ORD also requests SAB input on selected research projects and products. This input ranges from advice on conceptual design to peer review of specific products. The decision to request SAB input or review is based on such factors as the complexity and significance of the research, and the expected benefits, costs and timing of the review.

Coordination of External Research

QUESTION 3: EPA's laboratory network is comprised of the ORD laboratories, program office laboratories, and ten regional laboratory organizations. Each of these laboratory organizations has different objectives with respect to EPA's mission. Where do contracted and external research fit into this network?

ANSWER:
In addition to its network of intramural laboratories, the EPA's research organization—the Office of Research and Development maintains a National Center for Environmental Research (NCER). NCER supports high-quality research by the nation's leading scientists and engineers through extramural, competitively-awarded, assistance agreements and contracts. A description of this extramural research portfolio is available at < http://v26265neav506.aa.ad.epa.gov/nccrintranet/about/research-portfolio-june2010.pdf>.

NCER funds research grants and graduate fellowships in numerous environmental science and engineering disciplines through a competitive solicitation process and independent peer review. These grants engage the nation's best scientists and engineers in targeted research that complements the EPA's own intramural research program and those of our partners in other Federal agencies. In addition, through this same competitive process, NCER periodically establishes large research centers in specific areas of national concern. At present, these centers focus on children's health, particulate matter, computational toxicology, and biological threats to homeland security.

The EPA is also one of 11 Federal agencies that participate in the Small Business Innovative Research (SBIR) program established by the Small Business Innovation Development Act of 1982. To this end, NCER awards competition-based contracts that support the SBIR program. The goals of the NCER SBIR program are to develop, apply, and demonstrate, innovative technologies that (a) solve environmental problems and provide sustainable outcomes, and (b) ultimately will be commercialized.

Mr. Arthur Elkins, Jr., Inspector General,
U.S. Environmental Protection Agency

Questions Submitted by Chairman Andy Harris

1. It was a bit surprising the Agency attacked your report on the failure of EPA's endangerment finding to meet EPA or OMB guidelines for peer review, especially in light of the importance of peer review in this area. EPA's press release stated that "the report does not question or even address the science used or the conclusions reached," and an Agency official was quoted as asking: "Did it really take $300,000 to determine that while we dotted all the i's and crossed all the t's, someone thinks we used the wrong font?"

a. Do you agree with EPA's suggestion that the findings and recommendations in your report are excessively critical of inconsequential and unimportant issues? What is your response to EPA's attitude regarding the need for peer review in this and other scientific assessments?

OIG Response

We were asked to determine whether EPA followed key processes related to data quality in developing its endangerment finding. As with all systems of management controls, the controls are designed to minimize program risk—in this case, the risk of disseminating inaccurate or incomplete data in support of a significant regulatory action. Both the Office of Management and Budget (OMB) and EPA guidance state that such processes are important, thus we do not agree that our report's findings and recommendations addressed inconsequential or unimportant issues.

Our report's primary conclusion was EPA did not obtain a peer review of the endangerment finding's technical support document (TSD) that met OMB peer review requirements for highly influential scientific assessments. While EPA had the TSD reviewed by a panel of federal climate change scientists, these reviewers' comments and EPA's responses to those comments were not publicly reported as is required for peer reviews of highly influential scientific assessments. The Agency contended that the document was not a highly influential scientific assessment because it summarized other scientific assessments, and thus was not subject to the more rigorous peer review requirements. We believe it is a highly influential scientific assessment. EPA implicitly and explicitly weighed the strength of the available science by its choices of information, data, studies, and conclusions included in and excluded from the TSD. Also, in our judgment the TSD synthesized multiple factual inputs, data, models, and assumptions.

We did not determine whether a more rigorous peer review of the TSD would have substantially changed the TSD or affected the Agency's endangerment finding decision. However, we believe whether an agency follows OMB guidance for conducting peer review of scientific information used in agency actions is important because these procedures are intended to ensure that the most

important and influential scientific documents receive the most rigorous and transparent peer reviews. We also believe that identifying areas of the guidance and specific situations that may be open to differing interpretations is important, particularly for making peer review decisions on future actions. Our report's recommendations address areas of EPA's guidance that need to be revised to: 1) be consistent with OMB guidance; 2) provide more detail on how to assess other organizations' data; and 3) ensure documentation of the Agency's peer review decisions. We believe these are important recommendations for helping to assure the quality of data used by EPA in future actions.

2. One of the recommendations in your Compendium of Unimplemented Recommendations for EPA that was originally made in 2005 and has not yet been implemented is to "conduct an unbiased analysis of the mercury emissions data to establish a maximum control technology floor in accordance with the requirements of the Clean Air Act." EPA's final Utility or mercury MACT rule is currently being reviewed by OMB. Why was this analysis important?

OIG Response

An unbiased analysis of the mercury emissions data to establish a maximum achievable control technology (MACT) floor in accordance with the Clean Air Act is important for two reasons. First, it is needed to set a limit that achieves the emission reductions required by the Act. Second, such an approach was not taken by EPA in developing the limit for existing sources (i.e., the MACT floor) for its proposed MACT in 2002.

Clean Air Act Section 112(D)(3) describes how EPA is to set emissions limits for new and existing sources. New sources are required to meet the emissions limits achieved in practice by the best controlled source in the industry. Existing sources are to achieve, at a minimum, the emissions limits achieved in practice by the top performing 12 percent of all existing sources. Thus, an unbiased analysis of emissions data is needed to establish the minimum level (or floor) of emission reductions required for all sources.

In 2005, we reported on EPA's development of its proposed rule for controlling mercury emissions from coal-fired steam generating electric utilities. This rule proposed two potential approaches to controlling emissions: 1) a maximum achievable control technology limit; or 2) a performance-based market approach. We reported that evidence indicated that EPA senior management had instructed EPA staff to develop a MACT standard for mercury that would result in national emissions of 34 tons annually, instead of basing the standard on an unbiased determination of what the top performing sources were achieving in practice. The 34-tons-per-year target was based on the amount of mercury reductions expected to be achieved as a co-benefit from implementation of nitrogen oxide (NOx) and sulfur dioxide (SO_2) controls under a separately proposed, but related, air rule.

3. Can you describe the failure of the Agency to appropriately inform its employees about its scientific integrity policies? Has EPA implemented any of your recommendations?

OIG Response

In our July 2011 report entitled *Office of Research and Development Should Increase Awareness of Scientific Integrity Policies*, we focused on whether EPA's Office of Research and Development (ORD) had controls to address scientific integrity and research misconduct and the effectiveness of those controls. We did not look at EPA as a whole. We found that ORD had internal controls that included policies, procedures, training, and peer review. However, ORD did not evaluate the effectiveness of those controls for scientific integrity and research misconduct. ORD asserted that few reported instances of misconduct meant that it generally does not occur. However, few identified instances of research misconduct could signal that staff lacks awareness of key criteria and reporting requirements necessary to identify and report misconduct.

During our review, we issued an electronic survey to over 1,300 ORD science staff and received nearly 500 responses. We found that 65 percent of respondents were unaware of EPA's Order 3120.5 addressing research misconduct, and 32 percent were unaware of EPA's Principles of Scientific Integrity. We also found that ORD had not updated the Principles of Scientific Integrity E-Training since June 2005. The existing e-training was not mandatory for ORD staff and did not include actual examples to aid understanding by training participants. Our survey found that 66 percent of respondents did not complete the training. Those who have not completed the training may be unaware of key criteria regarding scientific integrity.

We made several recommendations to ORD. We recommended that ORD periodically test the effectiveness of controls to address scientific integrity and research misconduct. We also recommended that ORD work with EPA offices to initiate outreach on EPA Order 3120.5 to raise awareness on roles/responsibilities and reporting steps, and to identify EPA staff and managers who should complete the Principles of Scientific Integrity E-Training. Lastly, we recommended that ORD continue to work with unions to update and implement e-training. Such updates should include making the e-training mandatory for all ORD staff, ensuring that the updated course contains actual examples, and creating a system for maintaining current contact information for reporting instances of scientific integrity and research misconduct. ORD agreed with our recommendations.

Since our report was issued, EPA has taken action to implement our recommendations. For example, EPA is developing a new Agency-wide policy on scientific integrity. A draft policy was issued on August 5, 2011, and the final policy was scheduled for completion by December 2011 by the Office of Science and Technology Policy, though that deadline has since been delayed. ORD has developed a review protocol to test the effectiveness of the policy once finalized. Also, in August 2011, EPA named a Scientific Integrity Official and Scientific Integrity Committee with officials in each program and regional office. Together this group makes up EPA's Scientific Integrity Committee. EPA's scientific integrity committee will work with Agency partners to initiate outreach on EPA Order 3120.5 to raise awareness of roles/responsibilities and reporting steps by December 31, 2011. Finally, updates on the

Principles of Scientific Integrity E-Training are under development. EPA is working with the unions to make the e-training mandatory. The training will include actual examples. The schedule for course completion is July 2012 with training of staff to be completed by September 2012.

4. EPA has listed "Taking Action on Climate Change" as a top goal in the Agency's strategic vision. Does EPA have a comprehensive research plan to achieve this objective?

OIG Response

In our February 2009 report entitled *EPA Needs a Comprehensive Research Plan and Policies to Fulfill its Emerging Climate Change Role*, we found that EPA's latest plan for future climate change research did not address the full range of emerging information needs. We recommended that EPA establish a formal, transparent research requirements determination process that includes well-defined procedures for identifying a unified set of priority climate change research needs; and establish a formal mechanism to track regional research needs from research project selection to completion. In response, EPA agreed to make ORD's and the Global Change Research Program's (GCRP) research prioritization processes more transparent to the program and regional offices. Specifically, the National Program Director for the GCRP would issue a memorandum describing how GCRP priorities are set on an annual basis. In addition, they committed to a memorandum summarizing the ORD mechanisms to communicate and coordinate GCRP's work, and a survey of EPA stakeholders regarding the timeliness and usefulness of its products to enhance research planning. In June 2011, EPA issued a draft framework for its research on air, climate, and energy issues. The OIG has not evaluated the effects of EPA's actions in response to our 2009 recommendations, nor whether the 2011 draft framework constitutes a comprehensive research plan to achieve its strategic vision on climate change.

5. Please describe your office's views on EPA's handling of endocrine disruption research.

OIG Response

In our May 2011 report entitled *EPA's Endocrine Disruptor Screening Program Should Establish Management Controls to Ensure More Timely Results*, we reviewed whether EPA has planned and conducted the requisite research and testing to evaluate and regulate endocrine-disrupting chemicals. We specifically focused on EPA's Endocrine Disruptor Screening Program (EDSP), which is administered by the Office of Chemical Safety and Pollution Prevention (OCSPP) with support from ORD. In 1998, EPA established EDSP which uses a two-tiered screening and testing approach using validated assays to assess endocrine effects.

We found that 14 years after passage of the Food Quality Protection Act and Safe Drinking Water Act amendments, EPA's EDSP had not determined whether any chemical is a potential endocrine disruptor. The Agency had believed it would take, at most, one year for prevalidation of the assays and one year to validate the studies. In his February 2010 testimony before Congress, the EPA Deputy Assistant Administrator for OCSPP explained that because of the many complexities in methods development and validation of Tier 1 assays, validation of Tier 1

assays took 10 years and is ongoing for Tier 2 assays. An EDSP manager told us that EDSP was unaware of the complexities, resources, and time needed to validate assays until years after EPA's 2001 settlement agreement with the National Resources Defense Council (NRDC) was signed. However, EDSP did not substantially revise its milestones for completing assay validation in its status reports to NRDC. For example, 9 of the 11 updates that EPA provided to NRDC for the estrogen receptor binding assay incrementally adjusted the milestones, collectively, by 4 ½ years.

While we acknowledged that EDSP encountered difficulties and delays, we determined that its lack of progress was also due to a lack of management controls over the program. EDSP had not developed a management plan laying out the program's goals and priorities or established outcome performance measures to track program results. EDSP had not finalized specific procedures to evaluate testing results. Finally, EDSP had not clearly defined the universe of chemicals it plans to evaluate over time. Developing a management plan would ensure that the program's goals and priorities are transparent so EPA's leadership and Congress can assess whether the goals of the program are being achieved at a reasonable cost and schedule.

We recommended that EPA: 1) define and identify the universe of chemicals for screening and testing; 2) develop and publish a standardized methodology for prioritizing the universe of chemicals for screening and testing; 3) finalize specific Tier 1 and Tier 2 criteria to evaluate testing data; 4) develop performance measures; 5) develop a comprehensive management plan; and 6) hold annual program reviews. In its response to our recommendations, OCSPP stated that it planned to use computer models and *in vitro* high throughput assays in the EDSP to prioritize chemicals. In the long-term, OCSPP plans to replace Tier 1 *in vivo* assays with *in vitro* high throughput assays. OCSPP stated that its approach is based on advances in computational modeling and molecular biology, understanding of endocrine-specific initiating events, and adverse outcome pathways as well as robotics for conducting rapid in vitro assays on hundreds of chemicals simultaneously. The OIG has requested more information from OCSPP about how it plans to validate high throughput assays since the EDSP is required to use validated tests.

6. Your office has been critical of EPA's process for selecting impartial scientific advisory panels. Can you describe the problems that have occurred in the Agency's handling of external peer review panels?

OIG Response

The OIG has issued two evaluation reports regarding EPA's peer review process since 2004. While these reports did not identify specific instances of biased panels, we noted areas where EPA could improve its controls over the panel selection process.

In our November 2004 entitled *Review of Conflict of Interest Allegations Pertaining to the Peer Review of EPA's Draft Report, "Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster,"* we reported on allegations of conflicts of interest regarding a peer review panel established to review a draft evaluation of human exposure from the World Trade Center (WTC) disaster. We found that the peer review panel included one panelist with an extensive history of providing expert testimony and similar services for

defendants in asbestos lawsuits, and two panelists who had made prior public statements regarding the safety of the air around the WTC site. These circumstances provided a basis for the perception that one panelist had a potential conflict of interest and that two panelists had potential biases that would prevent them from providing impartial input. We also found that EPA's contractor tasked with convening the panel did not inquire whether the three panelists had received funding from industry or had publicly expressed viewpoints on the issues to be reviewed.

We made a number of recommendations to better ensure that guidance in EPA's Peer Review Handbook will be fully followed, including that EPA provide: 1) better oversight of peer review contracts to ensure that potential panelists are asked about industry financing and their relationship with clients; and 2) supplemental guidance and training of peer review leaders regarding the types of information they may need to obtain about potential panelists' opinions and viewpoints when they assess whether panels are independent and balanced. EPA agreed with our recommendations. In response to our draft report, ORD issued a policy announcement that required that specific conflict of interest provisions be included in task order statements of work for EPA peer reviews, unless these provisions are waived by the National Center for Environmental Assessment (NCEA) Director. These provisions adequately addressed many of our concerns. ORD also identified milestone dates for developing additional guidance to supplement the existing EPA Peer Review Handbook, revising existing training materials, and developing a peer review website. Further, ORD stated it would ask the Science Policy Council to adopt an Agency-wide policy directing its contractors to use the information-collection forms that are currently being used by the EPA Science Advisory Board and the National Academy of Sciences to aid staff in assessing peer review panel balance.

In our April 2009 report entitled *EPA Can Improve Its Process for Establishing Peer Review Panels*, we noted that NCEA's peer review panel selection process did not differ in many aspects when compared to the processes of four other science-based organizations. However, since NCEA peer review panels are not designed to obtain consensus, NCEA strives to select "impartial" panelists. We found that this concept was vaguely defined in OMB and EPA guidance and was not explained in any NCEA-specific operating guidance. Further, NCEA did not have procedures for addressing conflicts of interest or potential biases impacting a panelists' impartiality that became known after a panel had completed its deliberations. Also, there was no clear documentation of authority and responsibility for making final determinations regarding panel selection or how potential conflicts of interest were resolved. We made recommendations to ORD to improve management controls by better defining the concept of "impartiality" and maintaining records of all management decisions pertaining to the selection of peer reviewers, particularly resolution of potential conflicts of interest. We also recommended that guidance be developed to address conflict of interest issues that arise after panel formulation. ORD agreed with our recommendations and certified that all corrective actions were completed as of December 2009.

EPA Office of Inspector General (OIG) Responses to
Questions for the Record

Rep. Randy Neugebauer

1. Has the EPA indicated any willingness to improve its selection of impartial scientific advisory panels? What problems have you observed in this regard, and how important is it to the soundness of the EPA's scientific findings to engage with truly unbiased external peer reviewers?

OIG Response

The OIG has issued two evaluation reports regarding EPA's peer review process since 2004. Based on EPA's formal responses to these reports, EPA has indicated a willingness to improve its selection process for peer review panels.

In our November 2004 entitled *Review of Conflict of Interest Allegations Pertaining to the Peer Review of EPA's Draft Report, "Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster,"* we recommended that EPA take several actions to better ensure that guidance in EPA's Peer Review Handbook was fully followed. This included providing: 1) better oversight of peer review contracts to ensure that potential panelists are asked about the industry financing they have received, and their relationship with any clients whose interests might be affected by the subject being peer reviewed; and 2) supplemental guidance and training of peer review leaders regarding the types of information they may need to obtain about potential panelists' opinions and viewpoints when they assess whether panels are independent and balanced. EPA agreed with our recommendations. In response to our draft report, EPA's Office of Research and Development (ORD) issued an policy announcement that required that specific conflict of interest provisions be included in task order statements of work for EPA peer reviews, unless these provisions are waived by the National Center for Environmental Assessment (NCEA) Director. These provisions adequately addressed many of our concerns. ORD also identified milestone dates for developing additional guidance to supplement the existing EPA Peer Review Handbook, revising existing training materials, and developing a peer review website. Further, ORD stated it would ask the Science Policy Council to adopt an Agency-wide policy directing its contractors to use the information-collection forms that are currently being used by the EPA Science Advisory Board and the National Academy of Sciences to aid staff in assessing peer review panel balance.

In our April 2009 report entitled *EPA Can Improve Its Process for Establishing Peer Review Panels*, we made several recommendations to EPA to improve the peer review process. Among them were: 1) define the concept of "impartiality" and maintain records of all management decisions pertaining to the selection of peer reviewers, particularly resolution of potential conflicts of interest; 2) in cases where panelists with potential conflicts or biases are accepted on

the panel, the records should include a memorandum of decision explaining the suitability and rationale for including or excluding each panelist, which is signed by an EPA official; and 3) develop guidance to address conflict of interest issues that arise after panel formulation and amend contracts for external peer review services to require that panelists re-certify their conflict of interest status prior to the panel convening. ORD agreed to all of our recommendations and certified that all corrective actions were completed as of December 2009. Further, we noted that in response to our 2004 report, NCEA had developed a questionnaire and received OMB approval for EPA contractors to use the questionnaire to help identify potential conflicts of interest or potential biases that may affect the selection of a potential panel member. The questionnaire asks potential panelists to address their possible financial conflicts of interest and those of their family members, as well as possible non-financial independence and impartiality issues.

Mr. David Trimble, Director,
Natural Resources And Environment,
U.S. Government Accountability Office

Questions Submitted by Chairman Andy Harris

(1) In your investigation on EPA's laboratory management, was the relevant information readily available from the Agency?

Because reliable data were not available, we were unable to document trends related to EPA's laboratory facilities' costs or workforce costs. We found that some of the laboratory facility data maintained by EPA's facility management and real property tracking system lacked sufficient data quality controls necessary for assuring sufficiently reliable data for management decisions. Although we determined that descriptive data on EPA's inventory of laboratory buildings and facilities in the database were sufficiently reliable for our purposes, other data such as operating costs and condition assessments were not sufficiently reliable for the purposes of our review. In addition, EPA could not provide us with sufficiently reliable data on its laboratory workforce. As EPA does not publish the number of employees in EPA's laboratories, either separately or in total, we made several efforts to gather such information including requesting it from program managers and regional offices with laboratories and from the Office of Research and Development. However, we were unable to verify the reliability of the data the offices provided because they used inconsistent data sources and did not provide supporting documentation describing how the data were compiled.

(2) Since you last testified before the Committee on EPA' s Integrated Risk Information System or IRIS program, which GAO has classified as a "high-risk program," EPA has moved forward with several assessments. Have you evaluated whether the Agency is following your recommendations and the recommendations of the National Academy of Sciences in these efforts?

We recently completed our review of EPA's IRIS assessment process and the agency's progress in implementing our prior recommendations. The objectives of this work were to evaluate (1) EPA's progress in completing IRIS assessments under its revised May 2009 process and (2) the challenges, if any, that EPA faces in implementing the IRIS program. On December 9, 2011 we issued our report on EPA's IRIS assessment process to the requester; Representative Miller, Ranking Member, Subcommittee on Energy and Environment, Committee on Science, Space, and Technology, House of Representatives. Consistent with GAO's protocols, at the request of Ranking Member Miller's office, we have agreed to restrict the public release of this report for 30 days from the date of issuance. We will then send copies to others who are interested and make copies available to others who request them

(3) GAO has stated in the past that "lack of complete and comprehensive environmental information on air and water quality...makes it difficult for EPA to evaluate the success of its policies and programs" and that "they need to use environmental indicators to prioritize its allocation of limited resources." Has EPA made the necessary changes to prioritize the most pressing environmental problems?

Reliable environmental information is needed to provide better scientific understanding of environmental trends and conditions and to better inform the public about environmental progress in their locales. However, EPA has struggled with providing a focus and the necessary resources for environmental information since its inception in 1970. When we last reported on this issue in 2004, we found that, while much data has been collected over the years, most water, air, and land programs lack the detailed environmental trend information needed to provide direction for future research and monitoring efforts.[1] At that time, we made a number of recommendations aimed at improving the quality, utility, and transparency of environmental information. EPA generally agreed with our recommendations, and has made some progress in trying to obtain and use improved environmental information over the past several years. However, since we issued our report in 2004, we have not conducted a comprehensive assessment of EPA's efforts to use environmental information to prioritize its allocation of resources.

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[1]GAO, *Environmental Indicators: Better Coordination Is Needed to Develop Environmental Indicator Sets That Inform Decisions,* GAO-05-52 (Washington, D.C.: Nov. 17, 2004).

(4) Your office has been critical of EPA's process for selecting impartial scientific advisory panels. Can you describe the problems that have occurred in the Agency's handling of external peer review panels?

EPA and other agencies rely on advice from federal advisory committees on scientific and technical issues. Because advisory committees provide input to federal decision makers on significant national issues, it is essential that their membership be, and be perceived as being, free from conflicts of interest and balanced as a whole. In 2008, GAO testified about continuing problems with the independence of advisory committee members — that is, their freedom from conflicts of interest — and the balance of the committees overall in terms of points of view and functions to be performed.[2]

In our 2008 testimony, we found that EPA's practices for ensuring the independence of its advisory panel members were better than that of the other nine agencies we reviewed. For example, unlike some of the other agencies we reviewed, EPA did not make inappropriate use of "representative" appointments—that is, an appointment expected to reflect the views of the entity or group they are representing and not subject to conflict-of-interest reviews. In addition, of the nine agencies GAO reviewed, only EPA consistently (1) collected information on committee members appointed as special government employees that enabled the agency to assess the points of view of the potential members and (2) used this information to help achieve balance. Moreover, the General Services Administration (GSA), the agency responsible for developing guidance on establishing and managing federal advisory committees, highlighted the practices employed by some of EPA's federal advisory committees in its training material as "best practices".

Hearing Questions for the Record

The Honorable Randy Neugebauer

(5) Has the EPA indicated any willingness to improve its selection of impartial scientific panels? What problems have you observed in this regard, and how important is it to the soundness of the EPA's scientific findings to engage with truly unbiased external peer reviewers?

As we discussed in our response to question 4 above, in 2008 GAO testified that EPA's practices for ensuring the independence of its advisory panel members were better than that of the other nine agencies reviewed. Although we made a number of recommendations in the report, on which our testimony was based, the report did not include any recommendations to EPA.[3]

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[2]GAO, *Federal Advisory Committee Act: Issues Related to the Independence and Balance of Advisory Committees,* GAO-08-611T, Washington, D.C.: Apr. 2, 2008).

[3] GAO, *Federal Advisory Committees: Additional Guidance Could Help Agencies Better Ensure Independence and Balance*, GAO-04-328 (Washington, D.C.: Apr. 16, 2004).

Hearing Questions for the Record

The Honorable Brad Miller

(6) Mr. Trimble, in your testimony you state that the EPA has not appointed a top science official with the responsibility and authority for all the research, science, and technical functions of the agency. Dr. Anastas is the Science Advisor of the EPA in addition to the head of ORD. Why is the Science Advisor not considered the science official with this responsibility and authority? Is this the best way to handle the role of science official at the EPA? If not, what are some alternative options?

In response to our recommendation to establish a top-level science official with the authority and responsibility to coordinate, oversee, and make management decisions regarding major scientific activities throughout the agency, EPA proposed to increase the responsibilities of its science advisor. However, it is not clear that this will fully address the issue and it may ultimately introduce additional challenges for EPA. We note that in 2000, the National Research Council reported that it had previously "underestimated the level of authority needed to achieve the necessary degree of cooperation and coordination of scientific activities and policy in the regulatory and regional offices." The Council also concluded that "no single individual could reasonably be expected to direct a world-class research program in ORD while also trying to improve scientific practices and performance throughout the rest of the agency," stating that "these jobs are inherently different." Lastly, the Council cautioned that "assigning agency-wide scientific authority to the assistant administrator for ORD might produce a conflict of responsibilities, because many decisions about science in the regulatory programs could affect ORD's budget or favor ORD's research over research done elsewhere."

In considering alternatives to EPA's proposal to increase the responsibilities of the science advisor, we note that improvements to the scientific leadership of EPA's research and laboratory operations will be driven by the level of authority and responsibility provided to the chosen top-level science official. In 2000, the National Research Council recommended that EPA Establish a deputy administrator for science and technology with the authority and responsibility to coordinate and oversee scientific activities throughout the agency. Although the Congress considered two bills in 2001 to establish a deputy administrator of science and technology, no legislation was enacted. While we did not specifically recommend that EPA establish a deputy administrator position, we believe that similar authority, including management of resources, will be required.

Appendix II: Additional Material for the Record

SUBMITTED STATEMENT FOR THE RECORD BY MR. M. GRANGER MORGAN, HEAD, DEPARTMENT OF ENGINEERING AND PUBLIC POLICY UNIVERSITY AND LORD CHAIR PROFESSOR OF ENGINEERING, CARNEGIE MELLON UNIVERSITY

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2011 November 17

Rep. Andy Harris, MD, Chair
Rep. Brad Miller, NC, Ranking Member
Subcommittee on Energy and Environment
House Science Committee
US House of Representative
2321 Rayburn House Office Building
Washington, DC 20515

Dear Congressmen Harris and Miller:

Several days ago I was contacted by committee staff about the possibility of testifying to the hearing you are holding tomorrow afternoon on the EPA Science Advisory Board. Because I had academic conflicts I was not able to attend the hearing. Last evening your staff indicated that arrangements could be made for me to testify over a video link, if I could get my testimony prepared and submitted by mid-day today. Accordingly, I dropped everything and prepared the testimony that follows.

I have just now been informed that my testimony is no longer desired. I understand that such things happen. However, having already spent the time to write my remarks I thought you, and some other Members might find it of some use to see what I had prepared:

My name is Granger Morgan. I am head of the Department of Engineering and Public Policy, an academic department located in the Engineering College at Carnegie Mellon University. Much of my career has involved research on environmental problems, including a focus on the characterization and treatment of uncertainty in such problems. I hold a PhD in Applied Physics. I am a member of the National Academy of Sciences.

I served as a consultant on studies conducted by the EPA Science Advisory Board (or SAB) beginning in the late 1970s. I became a member of the Board in 1996, and served as chair of the Board from 2004 to 2008. I left the SAB on September 30, 2009, and since then have had no formal involvement.

Thank you very much for the opportunity to speak to you this afternoon, and especially thank you for your willingness to accommodate my academic obligations and allow me to do this over a video link.

This afternoon I will concentrate my testimony on the role and performance of the SAB. However, I will conclude with a few more general remarks about the importance of research at the EPA.

During the years that I was involved with the SAB, its membership was consistently comprised of some of our nation's leading experts in environmental science and engineering. While an effort was made to assure disciplinary and gender diversity, the primary criteria for membership has always been two-fold:

1. Representation across all of the scientific disciplines that are key to the performance of EPA's mission; and,
2. Outstanding scientific credentials.

Following a 2001 GAO report that recommended improvements in the transparency of the selection process for SAB committee membership, major improvements were made. As the GAO subsequently noted approvingly "EPA revised the Board's policies and procedures, as GAO had recommended."[1] Details on these procedures can be found on the SAB's public web site.[2]

The role the SAB has played has varied somewhat from one administration to the next. However, in her 1990 book *The Fifth Branch: Science Advisors and Policymakers*, and his 1992 book *The Advisors: Scientists in the Policy Process*, both Sheila Jasanoff[3] and Bruce Smith[4] have argued that, together with the Defense Science Board, the SAB had become the most effective advisory board to a federal agency. Jasanoff concluded that, despite some early years of finding its way, by 1990 the SAB had become "a powerful and respected adjunct to EPA's regulatory programs" that was drawn from "...a representative cross section of the scientific community..." She notes that "Perhaps the most important reason [for the SAB's success]...is that the EPA's activities (labeled "science") has insulated the Board from overly close identification with EPA's regulatory goals and related implementation strategies." It is my assessment that this characterization has remained valid since Prof. Jasanoff wrote these lines over 20 years ago. The SAB continues to play an important role in assuring that the EPA's regulatory policy are based on sound science, and that its research programs focus on assuring that the Agency will have the science-base to address emerging environmental problems in the future.

In recent years, the SAB, and its various subcommittees, has performed three primary functions. It has:

1. Performed reviews of Agency work products;
2. When asked, it has undertaken special studies for the Agency; and
3. It has performed self-initiated studies on topics that the Board considers to be of critical importance.

Attachment 1 contains recent examples of products 2 and 3.

I will briefly comment on each of these functions. I should also note that there are a number of other functions, such as the periodic review of standards for criteria air pollutants, analysis of

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[1] GAO-09-773T.

[2] See: http://yosemite.epa.gov/sab/sabproduct.nsf/WebSABSO/NominationExperts?OpenDocument and http://yosemite.epa.gov/sab/sabproduct.nsf/WebSABSO/ethics?OpenDocument.

[3] Sheila Jadsanoff, *The Fifth Branch: Science Advisors and Policymakers,* Harvard University Press, 302pp., 1990.

[4] Bruce L. R. Smith, *The Advisors: Scientists in the policy process,* Brookings, 238pp., 1992.

clean air compliance analysis, and reviews of the performance of the EPA's laboratory system, that are handled by advisory committees other than the SAB.

Review Agency Work Products: The SAB typically spends the majority of its time performing reviews of Agency draft documents and other work-products. In a typical year, it completes 15 to 20 such detailed reviews.

In my experience, these reviews have played an important and consistent role in improving the quality of Agency work-products, assuring that the best available science and methods are being applied as the Agency conducts its work.

I do, however, have one concern about SAB reviews of Agency work-products. While EPA has gotten much better in recent years at assuring that all its work products receive external peer review, it is not clear to me that the SAB is consistently asked to review the Agency's most important work-products. Sometimes there appears to be some "venue shopping," by which I mean that some Agency staff use other methods, such as review panels assembled outside contractors. Given the volume of EPA work products that must be reviewed, using other methods is entirely appropriate because there is simply no way that the SAB could handle all of these products. However, I do believe that it would be valuable to reiterate the importance of using the SAB for review of the Agency's most important products.

Conduct Studies as Requested: From time-to-time when the Agency has a specific need it asks the SAB to conduct studies on its own. For example, in recent years, the SAB has assisted the Office of Research and Development in an exercise to help set future research priorities. The SAB has conducted a review of the scientific understanding of hypoxia (the "dead zone") in the Gulf of Mexico, drinking water contamination from partial lead line replacement, and evaluation of treatment technology for risks posed by the discharge of ballast water from ships (that can introduce invasive aquatic species).

Conduct Self-Initiated Studies: Over the years, the SAB has also played an important role by identifying issues that it believes need to receive greater Agency attention and has conducted its own studies on such topics. For example, for a number of years the SAB performed a series of studies to identify environment risks that were receiving insufficient attention, as well as studies to identify environmental issues that are not on the Agency's agenda, but are likely to become important in the future.

Some recent examples of such studies have been an assessment of the role of reactive nitrogen in the environment and a large study on how best to evaluate impact on ecosystems. Sometime these studies have significant impact on subsequent agency thinking and performance.

An example of such a study that did not have the impact we'd hoped for was a study conducted during my term as Chair of the SAB. Members of the SAB observed that the EPA was not as prepared as they might have been in responding to a number of past environmental disasters such as the aftermath of Katrina and of September 11. To help assure that the Agency is better prepared for future environmental disasters, the SAB undertook a self-initiated study in which we invited in a number of organizations that regularly deal well with environmental disasters to brief the SAB so that we could learn from their experiences. Unfortunately, the resulting report "Preparing for Environmental Disasters" (Attachment 2) was finalized late in 2008, so I believe got lost in the shuffle with the change to a new administration.

Some Concluding Remarks on Research at EPA: On two previous occasions, when I testified before this committee, in my capacity as Chair of the SAB, I stressed the importance of maintaining a strong research capacity in EPA in the areas of environmental science and engineering. This is important to assure that present and emerging regulations are based on a strong base of sound science. It is also critically important to assure that the Agency will have the scientific knowledge it will need to respond in a sensible and effective way to future environmental challenges.

Today, research on environmental issues is spread across many different federal agencies and across many groups in universities and the private sector. In my view, the federal government could do a better job of tracking all of these activities, making sure that the knowledge flows to EPA and other agencies as needed, and identifying critical research gaps.

While EPA may need from time-to-time to reshape the focus of the research it conducts in light of changing needs and challenges, I can definitively state that the research conducted across the nation outside of EPA is not sufficient to meet the Agency's needs. Without strong and consistent support for research within the EPA, the nation cannot reasonably expect the Agency to continue to accomplish its mission of protecting human health and the environment.

That concludes the testimony I would have presented. I hope you find it of some use.

Yours,

M. Granger Morgan
Head, Department of Engineering
and Public Policy
University and Lord Chair Professor
Professor, EPP/ECE/Heinz

MGM:pjs

Attachments

ATTACHMENT 1

Recent SAB comments on ORD Research Directions

Office of Research and Development (ORD) New Strategic Research Directions: A Joint Report of the Science Advisory Board (SAB) and ORD Board of Scientific Councilors (BOSC). EPA-SAB-12-001
http://yosemite.epa.gov/sab/sabproduct.nsf/804D1A3A4A393C028525793000732744/$File/EPA-SAB-12-001-unsigned.pdf

Office of Research and Development Strategic Research Directions and Integrated Transdisciplinary Research. EPA-SAB-10-010
http://yosemite.epa.gov/sab/sabproduct.nsf/E989ECFC125966428525775B0047BE1A/$File/EPA-SAB-10-010-unsigned.pdf

SAB reports responding to Agency requests for scientific analysis

Hypoxia in the Northern Gulf of Mexico: An Update by the EPA Science Advisory Board. EPA-SAB-08-003
http://yosemite.epa.gov/sab/sabproduct.nsf/C3D2F27094E03F90852573B800601D93/$File/EPA-SAB-08-003complete.unsigned.pdf

Efficacy of Ballast Water Treatment Systems: a Report by the EPA Science Advisory Board. EPA-SAB-11-009
http://yosemite.epa.gov/sab/sabproduct.nsf/6FFF1BFB6F4E09FD852578CB006E0149/$File/EPA-SAB-11-009-unsigned.pdf

SAB Evaluation of the Effectiveness of Partial Lead Service Line Replacements. EPA-SAB-11-015
http://yosemite.epa.gov/sab/sabproduct.nsf/964CCDB94F4E6216852579190072606F/$File/EPA-SAB-11-015-unsigned.pdf

SAB self-initiated activities

Reactive Nitrogen in the United States: An Analysis of Inputs, Flows, Consequences, and Management Options - A Report of the Science Advisory Board. EPA-SAB-11-013
http://yosemite.epa.gov/sab/sabproduct.nsf/67057225CC780623852578F10059533D/$File/EPA-SAB-11-013-unsigned.pdf

Valuing the Protection of Ecological Systems and Services. EPA-SAB-09-012
http://yosemite.epa.gov/sab/sabproduct.nsf/F3DB1F5C6EF90EE1852575C500589157/$File/EPA-SAB-09-012-unsigned.pdf

ATTACHMENT 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

OFFICE OF THE ADMINISTRATOR
SCIENCE ADVISORY BOARD

October 24, 2008

EPA-SAB-09-002

The Honorable Stephen L. Johnson
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Subject: SAB Advisory Report "Preparing for Environmental Disasters"

Dear Administrator Johnson:

I am pleased to send to you a self-initiated Advisory Report of the EPA Science Advisory Board (SAB) titled "Preparing for Environmental Disasters." Our primary motivation in this effort has been to help the Agency become less reactive and more anticipatory and to think more broadly about how it identifies and assesses possible future large-scale environmental disasters and develops plans for responding to and communicating about them.

EPA's statutory responsibilities in such settings are limited, and in the context of an environmental disaster, "that's not my department" is not a satisfactory answer to a concerned general public that will look at the Agency's name and expect it to take a wider range of responsibilities than it is likely to actually have. The public may not understand, or in the face of a major environmental disaster care very much, about the intricacies of bureaucratic or political constraints. Thus, they may blame EPA for the shortcomings of others.

It is very much in the Agency's interest to assure that preparations for possible future disasters have been well developed and that there are not gaps in responsibility or response. While it is clear that the Agency has already undertaken extensive preparations to deal with a range of specific environmental disasters, we also recommend that EPA also invest modest additional resources in some broader efforts.

To this end the SAB recommends that the EPA establish a small interdisciplinary Environmental Disaster Assessment Team of five to seven professionals who are charged with identifying, prioritizing and assessing potential environmental disasters. This team should develop a system to identify potential environmental disasters, prioritize them based on probability and consequence, and identify common attributes and response strategies that could improve the efficiency and effectiveness of agency responses.

In addition, the proposed Environmental Disaster Assessment Team should perform, or arrange for others to perform, reasonably comprehensive assessments of those disasters deemed to be of greatest concern. It should then help and advise the Agency to fully: 1) identify gaps in coverage by Federal, State and Local authorities and needs for improved coverage, coordination and preplanning; 2) develop prior arrangements with experts and organizations who can provided the needed knowledge and skills and develop a geo-coded list of this expertise so that these connections can be made rapidly in an emergency; and 3) identify short term waivers to regulations that might be needed and prearranged mechanisms to achieve these waivers in a way that balances efficiency with protection and other objectives.

In undertaking this self-initiated study, one of the first steps the SAB took was to invite a set of briefings from a range of organizations that have extensive experience in dealing with a wide variety of environmental disasters. We did this because we wanted to see if there were general lessons to be drawn that might be relevant to the EPA's needs, and because we wanted to get ourselves "grounded" in examples of a number of real events so that our deliberations would not be too abstract.

From these examples we concluded that the Agency would be well advised to more systematically examine and seek to learn from the best practices of other public and private organizations. In so doing, it should seek strategies by which it, and other responsible parties, might better:

1) *anticipate, assess, plan for, and practice responses* to deal with major events that plausibly might occur in coming years;
2) *learn rapidly* what is going on and developing a rapid and rough sense of what risks may exist to people and the environment;
3) *effectively coordinate and communicate* with other key players including first responders and the public;
4) *respond with flexibility* to the specific needs and circumstances of the event at hand, including the ability to adapt procedures and make real-time decisions when previous plans are not working;
5) *delegate* decision authority to responsible individuals in the field; and
6) *mobilize* personnel and resources in a rapid and orderly way.

Beyond these general recommendations the report makes a number of more specific recommendations, many of which should help to improve EPA's capacity in the emergency response program.

The SAB recommends that the EPA compile an inventory of existing models, tools, data and resources, *including those that, while developed for other purposes, might be made useful for disaster response*; perform a comprehensive assessment and develop a report on the gaps in the available resource systems; solicit feedback from users of these tools, particularly local and state personnel and regional EPA managers, regarding resource systems; and identify further development and research needs.

The SAB recognizes that field measurements made during the early stages of a disaster have a different purpose than field measurements made for long-term monitoring and remediation. Emergency responders and citizens need fast order-of-magnitude

indications of the nature and level of hazards they may face. Accordingly instrumentation, quality assurance procedures for authorizing the release of data, and measurement priorities should be designed to appropriately meet those needs. While recognizing the progress that has been made in the development of the Environmental Response Laboratory Network, the report recommends that the agency pay additional attention to developing procedures for rapid field measurement, data analysis and data release during the early stages of emergencies, as well as protocols for how those procedures will be modified to assure greater precision and quality control as needed in later stages of the life-cycle of an environmental disaster.

The report makes a variety of other more specific recommendations related to tools for data display and analysis, documentation of decisions, routine *post-hoc* performance audits, and improving communication.

In this latter context, the report notes that virtually all of the Agency's work in communication with the general public lacks a key empirical foundation. To correct this deficiency, the SAB recommends that the Agency reinvigorate its program in behavioral social science application and research, perhaps by reestablishing the very successful collaboration it once had with National Science Foundation's Decision Research and Management Science program. This should include a strong program in empirically based methods of risk communication as well as development, demonstration and evaluation of mechanisms for better including public values and preferences in post-disaster clean-up decisions.

Clearly the SAB is not the right organization to develop detailed operational plans to deal with environmental disasters. Rather, it is our hope that by taking a fresh independent look, this report may persuade the Agency to begin to add to its current activities the kind of broader, more anticipatory approach we believe is needed.

In the future, once the agency has developed a broader planning process and plans, the SAB would be happy to provide thoughtful expert reviews and advice on the technical and behavioral dimensions of those processes and plans.

Sincerely,

/Signed/

Dr. M. Granger Morgan
Chair
U.S. EPA Science Advisory Board

NOTICE

This report has been written as part of the activities of the EPA Science Advisory Board (SAB), a public advisory group providing extramural scientific information and advice to the Administrator and other officials of the Environmental Protection Agency. The SAB is structured to provide balanced, expert assessment of scientific matters related to problems facing the Agency. This report has not been reviewed for approval by the Agency and, hence, the contents of this report do not necessarily represent the views and policies of the Environmental Protection Agency, nor of other agencies in the Executive Branch of the Federal government, nor does mention of trade names of commercial products constitute a recommendation for use. Reports of the SAB are posted on the EPA website at http://www.epa.gov/sab.

U.S. Environmental Protection Agency
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*This roster reflects the SAB membership during 2007 and 2008 when the activity was conducted.

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Mr. Thomas Miller, Designated Federal Officer, EPA SAB, Washington, DC

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SAB Advisory Report: Preparing for Environmental Disasters

1. Background

Even with improved preparation and careful advanced preventive actions, occasional environmental disasters are inevitable. They will arise from natural events, such as storms, earthquakes, and volcanic eruptions that have significant human and environmental impacts (SAB, 1995, 1999). Unfortunately they may also result from accidental or intentional human events, such as large spills, structural collapse, facility explosions or terrorist attacks.

When disasters with large environmental consequences occur, the public naturally looks to EPA to play a central role in characterizing environmental impacts, protecting human health and ecosystems, and in coordinating and overseeing post disaster clean-up.

However, EPA's authority covers only a subset of the issues that may arise in an environmental disaster (See Box 1, Appendix A). These include protection of drinking water supplies, the cleanup of contaminated buildings, and the development of a nationwide laboratory network to support response. EPA has developed an Emergency Response Business Plan[1] and continues to work hard to prepare for those aspects of disasters for which it has responsibility, following the general framework laid out in the National Response Framework (see Figure 1, Appendix A)

Other federal, state, and local agencies have primary responsibility for other aspects of dealing with environmental disasters, including First Response. When the scale of a disaster is large, or especially politically salient, senior political leaders also become involved. In such situations, EPA has found itself buffeted by forces over which it has little or no control or authority. At the same time, the public may not understand, or in the face of a disaster care very much, about the intricacies of bureaucratic or political constraints and blame EPA for the shortcomings of others.

While no one can predict the future, we believe that it should be possible to identify, at least in general terms, the range of large-scale environmental disasters that could plausibly arise from natural causes (earthquakes, hurricanes), accidents (accidental explosions, structural collapse) and terrorist events. The EPA has already done some of this, partly in response to previous SAB investigations and recommendations (SAB, 1995, 1999). However, in crisis situations large organizations are rarely capable of rapid innovation. Rather, they respond with previously developed "standard operating procedures" (Allison and Zelikow, 1999). As a result, if EPA is to improve its response to future large-scale environmental disasters it must have performed needed research and developed plans in anticipation of the range of plausible contingencies. At least as important, Agency personnel must have practiced and refined these plans in "table-top" or

[1]The Emergency Response Business Plan is designed to facilitate readiness to deal with five simultaneous incidents of national significance (INS) while also maintaining effective "day-to-day" capabilities.

other exercises that address both the risks and the likely complex institutional setting in which the Agency will likely have to execute its plans. The agency has already been doing these things for those aspects of a number of potential environmental disasters for which it has statutory authority. This report recommends that the Agency expand the range of those activities and invest modest resources in some broader efforts to scope and prioritize potential disasters with large environmental consequences. Indeed, if it does this well, EPA may even be able to assist other government and private sector entities to identify gaps and blind spots in their current thinking and improve their current preparation and response plans.

The purpose of this SAB self-initiated study has been to stimulate the agency to become less reactive and more anticipatory and to think more broadly about how it identifies and assesses possible future large-scale environmental disasters and develops plans for responding to and communicating about them. Clearly, the SAB is *not* the right organization to develop detailed operational plans. Rather, it is our hope that by taking a fresh independent look at the problem, and building on previous SAB efforts on the topic of preparedness for environmental disasters (SAB, 1995, 1999) we can persuade the Agency to begin to adopt the kind of broader, more anticipatory approach we believe is needed. In the future, once the agency has developed a broader planning process and plans, the Science Advisory Board would be happy to provide thoughtful expert reviews and advice on the technical and behavioral dimensions of those processes and plans.

The Board would like to recognize and thank Agency staff for its insights, critical commentary, and assistance in this effort.

2. Learning from Others

In undertaking this self-initiated study, one of the first steps the SAB took was to invite a set of briefings from a range of organizations that have extensive experience in dealing with a wide variety of environmental disasters. This was done for two reasons: a) because the SAB wanted to see if there were general lessons to be drawn that might be relevant to the EPA's needs; and, b) because the SAB wanted to get itself "grounded" in examples of a number of real events so that our deliberations would not be too abstract.

People who graciously shared their time and experiences in disaster prevention and management with the SAB over the course of the study are listed in Appendix B to this report. In reviewing the most successful of the efforts the SAB identified a number of themes and approaches that it believes will likely be common to any effort to deal effectively with environmental disasters. These include:

1) *Anticipating, assessing, planning and practicing* to deal with events that can reasonably be anticipated to occur. When this is done, previously developed operational and communication plans, trained personnel, and previously identified instrumentation and materials can all be rapidly and efficiently brought to bear on the problem.

2) *Learning rapidly* about what is going on and developing a rapid and rough sense of what risks may exist to people and the environment. This means, for example, that field measurements made in the early stages of a disaster should probably be

designed quite differently (different instruments, quality assurance, etc.) than measurements that are made for long-term monitoring and remediation. It means that one needs to have access to and prior experience with appropriate fast modeling and monitoring tools. It also means that with some prior geo-coded inventories of what materials (sewage, chemical stores, etc.) might be available for release during a disaster one should be able to anticipate some aspect of likely exposures, and the consequent measurement and modeling needs.

3) *Communication* with the general public and with non-technical decision makers in a meaningful way. There is clear empirical evidence that such communication will be much more effective if it is based on the prior development and iterative empirical testing of at least the kernels of key messages and disseminated by trusted organizations or individuals. There is also clear evidence that helping people figure out what numbers mean, what their choices are, and what they should do to protect themselves, their children, their employees, and the environment, are all critical.

4) *Coordination* and communication with other key players. EPA has specific statutory responsibilities in terms of what it is and is not responsible for. However, in the context of an environmental emergency, "that's not my department" is not a satisfactory answer. The general public is likely to look at the Agency's name and expect it to take a wider range of responsibilities than it is likely to actually have. In order to avoid serious misunderstanding and inadequate response, there clearly needs to be coordination in both message and action. The SAB saw the briefings it received as strongly suggesting that such coordination and effective communication would almost certainly *not* happen unless there are pre-developed plans and messages that have been developed and rehearsed among relevant parties.

5) *Flexibility*, including the ability to adapt procedures and make real-time decisions when previous plans are not working. It was clear from the briefings that the most successful private organizations the SAB heard from have been very good at identifying strategies that are not working and making improvement rapidly. Figuring out how to replicate this ability to adopt an iterative approach in federal agencies clearly presents challenges that need to be addressed.

6) *Delegation* to folks in the field, and the willingness of senior management to back their decisions, was another characteristic of the successful private organizations the SAB heard from. Again, figuring out how to replicate this capability in Federal agencies clearly presents challenges that need to be addressed.

7) *Mobilization* of personnel and resources in a rapid and orderly way was a characteristic of the successful private organizations the SAB heard from. In the case of EPA, there is considerable expertise across the agency, including its laboratories, which might be mobilized if there were adequate prior planning, training and rehearsal. How much of this has already occurred is not clear to the SAB.

The SAB recommends that as EPA works to improve the way in which it identifies, assesses, prepares for, and responds to possible future environmental disasters, it should examine and seek to learn from the best practices of other public and private organizations.

3. Identifying a Range of Potential Environmental Disasters

There is no way to know the future. Some enormous but imaginable environmental disasters, such as the impact of a large meteorite, or a continental-scale lava flow, are of such low probability that it would make little sense for EPA, with its limited resources and large set of obligations, to spend time thinking very much about them (Smil, 2008). Other environmental disasters will be sufficiently small or local in extent that it is unlikely that EPA would become involved. However, there are other regularly occurring environmental disasters, such as floods and hurricanes that have significant human health and environmental impacts (SAB, 1995, 1999).

When Agency staff think about environmental disasters, typically, they start with one of the 15 DHS National Planning Scenarios[2] and the Agency's authorities (Box 1, Appendix A) and go from there. While this is appropriate, the committee believes that it would also be wise for the Agency to develop a systematic taxonomy of plausible events and plausible combinations of events[3], ask what would be the environmental consequences of each, and then in a systematic way, starting with those whose consequences are potentially most serious, ask:

- what agencies would deal with the various consequences?
- what responses and coordination would be needed?
- where are the gaps in authority and expertise?
- what other parties are likely to have key roles?
- what if any short term waivers to regulations and other rules might be needed and what mechanisms are needed to achieve these in a way that balances efficiency with protection and other objectives?
- what needs to be done to facilitate good coordination within EPA, with other Federal Agencies, with state and local government, and with the private sector?
- where are there commonalties across different types of environmental disasters that could be exploited to develop more efficient and effective response plans? and
- what would the public expect of the EPA?

A very simple illustration of how such a taxonomy might be developed is provided in Table 1 (see Appendix A). Other structures are also possible. The key point is to first

[2]EPA is an active participant in the DHS-coordinated Incident Planning Management Team (IMPT), which, among other activities, is conducting detailed panning related to the National Planning Scenarios. Note that all of the scenarios involving chemical releases involve "attacks." While these events could be extremely dangerous, so too could a wide range of accidental releases. The latter may actually be more likely.
[3]By combinations of events we mean things such as a large earthquake combined with wildfires, a consideration of whether key infrastructures such as power and communication continue to operate, or whether there are cross linkages between infrastructures (e.g. power available to run compressor stations in natural gas supply systems or to run pumps in water and sewer systems), etc.

develop some way to think systematically about the full range of plausible disasters the Agency might be called upon to address.

The entries in Table 1 are still abstract. The next step, once a taxonomy of this sort is developed, is to select a range of specific events and think through their consequences. Suppose, for example, that a major volcanic event was to occur in the Pacific Northwest - essentially a larger scale version of the Mt. St. Helens eruption but with impacts that extend to a number of population centers such as Seattle, Tacoma, Olympia, or the Portland area. Clearly, such an event could have a large number of consequences. In Addition, to wide-spread devastation of precious terrestrial and aquatic ecosystems and forest resources, there could be extensive loss of life, widespread destruction of built property, and disruptions of critical infrastructures, such as power supply, communication, roads and water. One way to explore these would be to build a set of "influence diagrams" that trace out various causal chains. Figure 2 (see Appendix A) shows a highly simplified example of the impacts that such an event might have on the sustained contamination of a water supply.

Figure 3 (see Appendix A) presents an illustrative time line for pre- and post-event planning and action. The main features of pre-event analysis include: identifying likely measurement needs; developing measurement tools and protocols, and risk analysis and consequence analysis tools; identifying likely communication needs and developing pre-tested communication modules that can be modified once the specifics of an event are known; identifying issues of jurisdiction/coordination; planning for longer term remediation needs; and identifying and implementing mitigating actions and strategies that could reduce or eliminate risks. Illustrations of a few post-event actions are shown on the right hand side of Figure 3.

Over the course of the past two years, the SAB has had occasion to review a number of geographical information systems being developed by different regional EPA offices. If these efforts were better coordinated, the result could be a very useful tool for pre-event analysis to identify and assess the various facilities that could result in sources of difficulty (such as chemical or other contamination). The availability of such a system or systems could also prove invaluable during the actual management of an event once it had happened.

Clearly, developing such assessments will take time and care. The agency will not be able to do this for a large number of potential natural, accidental and terrorist-caused disasters all at once. Accordingly,

> **the SAB recommends that the EPA establish a small interdisciplinary Environmental Disaster Assessment Team of five to seven fulltime professionals who are charged with working across the agency to identify, prioritize and assess potential environmental disasters.**

We believe that with the right people, resources, and mandate, such a group could make very substantial progress in just a few years. After developing a taxonomy of possible risk events, and working up a modest number of example assessments, such a group could then use these results as a basis to consult with Regional Offices, The National Homeland Security Research Center, key mission offices across the Agency, and the

Agency's Office of Research and Development, in order to set priorities across potential disaster scenarios (some of which would be generic in nature, some of which, like earthquakes or volcanic events, would be specific to geographical regions). As the work of such a small assessment team progressed, they would certainly find many situations in which the same sequences and responses apply across many different events and contingencies.

EPA does not have a mandate to deal with all aspects of environmental disasters. Indeed, in many cases, the legal mandate is limited to only a modest sub-set of all the issues that may arise. However,

the SAB recommends that the small Environmental Disaster Assessment Team recommended above start by prioritizing a systematically developed list of potential disasters and then that it perform, or arrange for others to perform, a reasonably comprehensive assessment of those that are deemed to be of greatest concern.

The SAB makes this recommendation for three reasons. First, without such a comprehensive anticipatory approach, the EPA runs a high risk of finding itself unprepared and playing catch-up in the face of future environmental disasters. Second, without such an approach, coordination with other Agencies may be spotty. Finally, without such a systematic approach, eventualities will likely arise in which no clear preparation has been made by *any* Federal agency to deal with at least some aspect of an acute environmental problem and, even if EPA's mission does not encompass that contingency, the public will likely look to the Agency for leadership, or blame the Agency for an inadequate response.

Of course, there are others at EPA's Homeland Security Research Center, EPA ORD, regional EPA offices, in DHS research centers, at Department of Energy National Labs, in universities, and in other research and operational entities, who have done portions of such assessments. Clearly, the proposed Environmental Disaster Assessment Team should build upon the prior work of such groups as it proceeds with this effort.

Having put in place an ongoing process to perform such assessments (starting with the highest priority issues), the Agency will be in a much better position to:

- prepare and practice response plans for a range of high probability events;
- identify likely gaps in expertise and develop prior arrangements with experts and organizations who can provide the needed knowledge and skills;
- develop a geo-coded list of this expertise so that these connections can be made rapidly in an emergency;
- identify short term waivers to regulations and other rules that might be needed and prearrange mechanisms to achieve these waivers in a way that balances efficiency with protection and other objectives;
- develop and pre-test public communications messages, that can be easily modified to meet the specific needs of different contexts, to deal with those events;
- engage in coordination activities with other Federal, State and private parties; and
- develop measurement and quality assurance protocols that will allow rapid dissemination and use of field measurements in the early stages of a disaster.

While the Agency is already doing many of these things in the context of specific risk scenarios and legislative authority, the SAB believes that great benefit could be obtained from a parallel effort that adopts a more holistic and comprehensive approach of the sort outlined.

4. Geographically Specific Tools for Data Display, Analysis and Decision Support

In this and the following section, we turn to a more detailed set of issues, some of which relate to the small Environmental Disaster Assessment Team proposed in Section 3, but most of which are more relevant to the ongoing work of the EPA emergency response program.

Assessing potential future disasters, planning for response, and executing an effective response once a disaster has occurred, all require information and modeling and analysis capabilities at a variety of scales (local, regional, and national). Local first responders such as fire, emergency services, or police, can respond and routinely are first to address the immediate needs created by small local disasters. However, as the spatial scale of the disaster increases additional resources, information and tools are needed to respond and address the consequences of the disaster.

EPA has developed a variety of spatial analysis tools incorporating geographic information systems (GIS) and fate and transport models that, while developed for other purposes, could be made applicable to the needs of emergency responders by providing information helpful in identifying vulnerable populations and environmental resources at the state, regional, and national scales. These tools incorporate GIS data layers such as land use, infrastructure, location of chemical storage facilities, industrial facilities, human census tract data, sensitive environmental and public health receptors, and a myriad of other spatially explicit databases into decision support systems. EPA has also developed and uses transport and fate models capable of estimating the dispersion of chemicals, particles, microorganisms, and radiation released by a disaster into the air and water. If modified for use in disaster setting, some of these tools could be particularly valuable for disaster managers responding to incidents at the regional scale. The following paragraphs provide details on a number of salient issues.

a) *Models, Tools, and Resources.* Maximum preparedness for short- and long-term emergency response actions requires development and maintenance and deployment of a variety of models, tools and other resources (resource systems). Consultations by EPA with SAB and Homeland Security Advisory Committee (HSAC) have addressed specific elements of this overall system resource portfolio but have not provided the overall context for SAB and SAB's Homeland Security Advisory Committee (HSAC) consideration of these reviews.

The SAB recommends that EPA compile an inventory of existing models, tools and resources, including those that, while developed for other purposes, might be made useful for disaster response.

Once these "assets" have been listed (including applicable assets from other agencies) they should be mapped against the list of disasters identified in National Planning Scenarios and by the proposed Environmental Disaster Assessment Team and their applicability to each should be established. EPA has special expertise in risk assessment of building disasters and building decontamination, water and wastewater infrastructure assessment, surface water and groundwater quality modeling, air quality modeling, emission locations and databases, municipal and industrial site locations, and ecological risk assessment. EPA tools may be especially useful in decision support for certain types of disaster response, and these applications should be identified *a priori*.

One example where this may already have happened is the Water Security Initiative (WSI), successor to the Water Sentinel Model that EPA developed for assessing the vulnerability of water distribution systems under various contamination scenarios. WSI consists of models and other tools to provide: enhanced physical security monitoring; water quality monitoring; routine and triggered sampling of high priority contaminants; public health surveillance; and, consumer complaint surveillance.

b) *Identification of Gaps and Prioritization of Research Needs.* Following completion of such an inventory of models and other tools,

The SAB recommends a comprehensive assessment and report of the gaps in the available resource systems, and a listing of needs for further development and research.

The list of gaps in the resource system inventory should be prioritized. This prioritization process should consider the environmental and human health consequences caused by missing tools or information, the impacts of related consequences (including spatial and temporal scales), and other relevant criteria. This analysis should enable optimization of the allocation of EPA resources to fill these gaps over the short-, intermediate- and long-term.

The SAB recommends that the listing of development and research needs (identified in the gap analysis) be prioritized and conveyed across the Agency.

Once gaps and research needs have been identified, the SAB would be pleased to review the results and offer its advice.

c) *Characteristics of Models, Tools and Resources.* Effective use of resource systems requires functionality and reliability under a wide variety of circumstances and conditions, including disaster response situations. These characteristics should include:

- *Portability.* To the extent possible, resource systems should be portable to allow transportation and usage in difficult field conditions. The systems should be designed to be field-ready.

- *Redundancy.* There should not be any single expert or expert-system that cannot be replaced in an emergency. Duplication of function is a necessity.
- *Interoperability.* Models and databases must be compatible with those from other agencies. Personnel with various backgrounds, and from other agencies, should be able to use them.
- *Resiliency.* These systems should be robust and have limited vulnerability. To the extent possible, resource systems should be able to operate when central power sources and direct internet access are not available, and they should not rely solely on standard communication lines to function.

d) *Dissemination and Maintenance of Resource Systems.* To achieve maximum effectiveness, resource systems must be disseminated to the full range of potential users, including first responders and long term-managers at the local and State level, in addition to EPA central office and regional staff and other federal agencies. Relevant databases such as the Toxics Release Inventory (TRI), which is under threat of losing essential data due to proposed changes in thresholds of reporting, is nationally computerized and available and should be preserved. The Chemical Storage Inventory under the Clean Air Act 112(r) is another example of data that can be helpful in emergency disaster planning and response and should be digitized for ready access by first responders. Resource systems should be maintained to keep their contents current, reliable and easily searchable.

The SAB recommends that EPA solicit feedback from users, particularly local and state personnel including first responders, and regional EPA managers, regarding resource systems and where necessary digitized databases to support improved disaster response decisions.

Periodic updates of resource systems should consider comments and criticisms from users. The results of audits of response performance following actual events and trials should also be used in maintenance and updating of resource systems.

e) *Document the Basis of Decisions.* During a disaster decision makers have little time and thus it would be inappropriate to require detailed written justification of all decisions that are made. At the same time, if the Agency is to learn from past experience, some documentation of the considerations and factors that lead to key decisions would be extremely valuable.

The SAB recommends that EPA develop simple streamlined methods to document the basis of decisions made in the course of managing environmental disasters.

For example, this might be as simple as equipping key decision makers with small digital audio recorders which would allow verbal documentation that could subsequently be transcribed.

f) *Audits of Event Response Performance.* EPA should play a special role as compiler and synthesizer of performance results and characteristics. The Agency often identifies problems which are commonly referred to as "lessons learned", but "lessons" are not really "learned" and have little value until procedures and behaviors are changed (continuous improvement). While we are aware of and have read the reports by the Agency's Inspector General on EPA's performance during several recent environmental disasters, we are not persuaded that these sufficiently meet this need.

The SAB recommends that EPA perform and encourage performance audits of event responses by its staff at the local, state, regional and national level.

g) *Sensitivity of Resource Systems.* In some cases, components of resource systems developed by EPA may be too sensitive to warrant general release to the public or to local and state entities.

The SAB recommends that EPA carefully assess the content of its resource systems to evaluate the security risks associated with their release.

Criteria recommended by SAB for this evaluation include the ability of system resources to be used to implement an attack, or to optimize consequences of an attack. Examples of resource systems that have components with considerable risk associated with release include the "consequence modeling" component of the Water Sentinel program and, to a lesser extent, the incident modeling in Emergency Consequence Assessment Tool (ECAT). For example, if a calibrated Water Sentinel model for a specific utility falls into the wrong hands, it could be used against that utility by attacking them at their most vulnerable distribution system locations.

h) *Development of Resource Clearinghouse.* The SAB endorses efforts like those in ECAT to compile a wide breadth of information in a user-friendly form. This work should also include internet enabled tools (with and without security-related access controls) and coordination of spatial data bases (land use, land cover, census data, chemical plants). It is presumed that all counties in the US have an inventory of all chemical facilities, power plants, water and wastewater treatment facilities, hazardous waste generators, storage facilities, hospitals, research labs, universities, etc. located within their jurisdictional boundaries, in terms of types and amounts of potential contaminants and their coordinates. These inventories, as well as Federal databases in which EPA has primary authority, need to be updated annually. Thus,

The SAB recommends that EPA emphasize its role in the development of centralized and streamlined virtual libraries of references, guidance materials and models, and other resources.

Completion of the tasks outlined in this section should prove valuable to the small interdisciplinary Environmental Disaster Assessment Team recommended above in

Part 3 of this report, and that team should be consulted in the formulation and completion of these tasks. However, this team should not be given primary responsibility for completing these tasks so as not to divert its attention from the critically important job of identifying, ranking, assessing and planning for possible future environmental disasters.

5. QA/QC for Data During Emergencies

Field measurements made during the early stages of a disaster have a different purpose than field measurements made for long-term monitoring and remediation. Emergency responders and citizens need fast order-of-magnitude indications of the nature and level of hazards that they may face. Accordingly instrumentation, quality assurance procedures for authorizing the release of data, and measurement priorities need to be designed to appropriately meet those needs.

Many existing EPA data protocols do not emphasize rapid response, because they have been developed to meet the needs of long-term monitoring and regulatory activities. Especially in the early stages of an emergency, the quality of data may have to be balanced against the need to get information to users on the time-scale they require. This balance should be worked out in advance, so that procedures are already developed and approved before the emergency occurs, and a graceful transition can be achieved from rapid order-of-magnitude assessment to increasingly more time consuming and accurate characterizations as time goes by (See Figure 2 in Appendix A). While the SAB is pleased to see the creation of the Agency's Environmental Response Laboratory Network, with its focus on "screening/sentinel laboratories," "confirmatory laboratories," and "reference laboratories" this is an issue that warrants additional attention.

The SAB recommends that EPA develop procedures for rapid field measurement, data analysis and data release to the public during the early stages of emergencies, as well as protocols for how those procedures will be modified to assure greater precision and quality control as needed in later stages of the life-cycle of an environmental disaster.

6. Improved Communication and Public Consultation

Communication needs and content are highly context dependent. Before, during and after events, the goals and methods for effective communications should be different. For example, during an event when immediate protective actions are needed, rapid one-way approaches are critical. However, before and after events, these methods are rarely appropriate. In these periods, dialogues with decision makers, stakeholders and representatives of the public are key ways for building knowledge about current contexts and information needs and preferences. Development of messages based on knowledge and empirical testing enhances the probability of effective decisions and actions during events. Without such fundamental and current knowledge, communications may create problems where few or none existed.

Effective communication between many different parties is essential: a) in performing assessments and making plans before an environmental disaster occurs, b) in protecting human health and ecosystems during the initial stages of an environmental

disaster, and c) in managing long-term protection, clean-up and recovery from an environmental disaster.

Communications about environmental disaster requires two-way interactions within the U.S. EPA, across agencies, and with partners and the public.[4] In designing any communications program, one must ask the question: "How can information be transmitted to elicit well informed decisions and behavior by individuals, first responders, decision makers and organizations?"

Communications need to occur throughout the process of assessing, preparing for, and responding to environmental disasters. Of course, the purpose and form of the communication often needs to change at different stages along the life cycle of an event (Figure 2 Appendix A). For example, immediate protective guidance is often necessary during the initial response phase while there is great uncertainty, while more specific guidance is provided during later stages when more information is available and uncertainties have been reduced.

No aspect of communication is more important than communication with the public – including both those directly affected by the event and the general public. Too often, communication is seen as the one-way conveyance of facts, guidance and decisions from experts and those in charge to a passive receiving public. Sometimes in a crisis situation such one-way communication is necessary ("You need to stay in your house and seal the doors and window because a cloud of toxic gas is rapidly approaching"). As elaborated below, even in such situations, communications are likely to be far more effective if generic versions have been carefully developed, empirically evaluated and refined ahead of time through careful two-way interaction with individuals who are typical of the intended audience.

Recent years have witnessed considerable progress in developing a scientific basis for risk communication. The key insight from this work is that *a priori* there is no such thing as an expert in the design of the content of effective risk communication messages. It is essential to adopt an empirical approach. Unless one understands the way in which a recipient will interpret and understand a message, even as simple a message as "Take a wet cloth to cover your face in the event you find yourself being exposed," one can have no confidence that it will be properly understood.

Behavioral social scientists have developed a variety of strategies to determine, through empirical studies, the "mental models" that people adopt in thinking about risks (Fischhoff, 2005; Morgan *et al.*, 2002). They have also developed empirical strategies for testing and refining possible messages (Fischhoff, in press). Unfortunately, with almost no behavioral social scientists on staff, EPA does not possess the expertise to make use of such methods.[5]

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[4]In this connection the EPA is developing and deploying an emergency management data architecture known as Emergency Management Portal (EMP). The office is also working closely with regions to establish communication standards and assure that needed equipment is available. Finally the Agency has developed a Crisis Communication Plan. However, none of these activities appear to be well informed by modern behavioral social science.

[5]EPA's National Homeland Security Research Center has run a series of workshops on "message mapping" (Covello et al., 2007). While these have identified many issues that deserve consideration in the event of

This absence of understanding and expertise also has implications for other aspects of EPA's mission. For this reason the SAB makes two related recommendations:

First, **ORD should re-establish its program in behavioral social science and risk communication research, perhaps by reinvigorating the very successful collaboration it once had with the NSF Program in Decision Research and Management Science (DRMS).**

Second, in assembling the small interdisciplinary Environmental Disaster Assessment Team proposed above in Part 3, **at least one or two of the members should have a strong working understanding of, and ability to apply, modern methods of empirical social science for developing risk communication strategies, and the design, testing and refinement of risk communication messages.**

Frequent, transparent interactions with partners (within the Agency, across agencies, and with others) in advance of events are an important part of building communication readiness. Purposes of these interactions and related research include:

- Determination of how *people form their concepts of risk* and related issues, as well as how people make decisions and what information influences their decisions.
- Development and rigorous *pre-testing of consistent messages* for a variety of scenarios and receivers. Scenarios formulation should include representatives of the public and mass media to ensure that exercises involve their perspectives and gauge the likelihood of behaviors that would have significant impacts in real events. Representatives of other partners appropriate to the scenario should also be involved both in drills as well as in debriefings after exercises. During an event, zero tolerance for false positives often works against providing the public with timely and useful protective information. The tradeoffs in risks (e.g., public health and environmental vs. organizational) are important considerations that should be clearly identified and articulated by decision makers. When uncertainty prevents a definitive decision, warnings that include protective actions and specific guidance should be issued with a caveat to stay tuned in for more certain information. Pre-testing such messages would yield considerable insights about what will and will not work well in eliciting desirable behaviors.
- Anticipation of how *people would respond to communication initiatives* (messages and interactive engagements), especially under stressful conditions. Research is needed to identify how first responders, decision makers and the public are most likely to respond to communication initiatives.
- Empirical research involving formative and summative *evaluations* of risk communication activities is essential to ensure continuing progress.

In environmental disasters EPA should endeavor to ensure that information the Agency has developed gets to the persons or organization that are trusted by the intended receivers (in crisis conditions) or partners (in routine conditions). In some situations, another entity or person (e.g., local official or community leader) will be seen as a more

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possible water security emergencies, no empirical studies are included of how various audiences might understand and interpret alternative messages.

trusted source of information. In those circumstances, the EPA should focus on getting the best possible information to that party and helping him/her promptly interpret and use the information correctly. In preparation for an event, EPA should a) recognize and be in contact with trusted *social networks* within a community, and discover the ways in which information is currently and rapidly *disseminated* (e.g., reverse 911, e-mail, instant messaging, YouTube and other networks)

There is an urgent need to improve consultation with the public on a variety of tough choices that many environmental disasters can present. An obvious example is decisions about "how clean is clean enough" when restoration to pre-disaster conditions is neither technically nor economically feasible. Effective mechanisms to perform such consultation are lacking.

The SAB recommends that the development, demonstration and evaluation of mechanisms for better including public values and preferences in clean-up decisions should be an element of the reinvigorated program of behavior research in ORD.

The SAB understands that EPA has developed a Crisis Communication Plan and already participates in a wide variety of multi-agency drills and exercises on disaster response. The SAB also recognizes that selected employees within EPA have been assigned to red or blue response teams, and they are already recognized for their capabilities in specialized areas of disaster response. These employees are expected to stop all other duties in the event of a disaster and devote themselves solely to the response for however long it takes. Such employees have laptop computers especially dedicated for disaster response, and they have successfully executed drills in "bunker" locations. However, it is our belief that shortcomings may still exist in the area of communications, and that the ability to locate and contact each person in the network during a disaster has not been given proper attention by the agency or by Homeland Security.

The SAB recommends that a failsafe method for communication among key members of the disaster response team be designed, implemented and tested on a regular basis.

Obviously, responders must be able also to communicate with critical models, databases, and decision support tools and convey the results of their analysis to responsible parties.

7. Summary and Restatement of Key Recommendations

Thinking broadly and becoming more anticipatory should be a goal of every agency. While it is doing a good job of addressing those aspects of environmental disasters for which it is responsible in the context of DHS National Planning Scenarios EPA would be well advised to *also* think more broadly and in a more anticipatory way about the full range of possible environmental disasters that could arise from natural causes, accidents or the actions of terrorists. To this end the Science Advisory Board recommends that the EPA:

a) Establish a small interdisciplinary Environmental Disaster Assessment Team of five to seven professionals who are charged with identifying, prioritizing and

assessing potential environmental disasters. This team should develop a system to identify potential environmental disasters, prioritize them based on probability and consequence, and identify common attributes and response strategies that could improve the efficiency and effectiveness of agency response.

b) The Environmental Disaster Assessment Team should perform, or arrange for others to perform, reasonably comprehensive assessments of those disasters deemed to be of greatest concern. It should then help and advise the Agency to further:
   - Identify gaps in coverage by Federal, state and local authorities and needs for improved coverage, coordination and preplanning;
   - Develop prior arrangements with experts and organizations who can provide the needed knowledge and skills and develop a geo-coded list of this expertise so that these connections can be made rapidly in an emergency;
   - Identify short-term waivers to regulations and other rules that might be needed and prearranged mechanisms to achieve these waivers in a way that balances efficiency with protection and other objectives.

In support of the mission of the Agency's emergency response program, the SAB recommends that the EPA:

c) Examine and seek to learn from the best practices of other public and private organizations. In so doing, it should seek strategies by which it, and other responsible parties, might better:
   - *anticipate, assess, plan for, and practice responses* to deal with major events that plausibly might occur in coming years;
   - *learn rapidly* what is going on and develop a rapid and rough sense of what risks may exist to people and the environment;
   - *effectively coordinate and communicate* with other key players including first responders and the public;
   - *respond with flexibility* to the specific needs and circumstances of the event at hand, including the ability to adapt procedures and make real-time decisions when previous plans are not working;
   - *delegate* decision authority to responsible individual in the field; and
   - *mobilize* personnel and resources in a rapid and orderly way.

d) Compile an inventory of existing models, tools, data and resources, *including those that, while developed for other purposes, might be made useful for disaster response*; perform a comprehensive assessment and develop a report on the gaps in the available resource systems; solicit feedback from users of these tools, particularly local and state personnel and regional EPA managers, regarding resource systems; and identify further development and research needs. Since some of these tools may involve sensitive information, their content, and associated access policies should be carefully reviewed to assure an appropriate balance between needs of local and regional responder and the public and the necessity for protection against misuse. Emphasize EPA's role in development

of centralized and streamlined virtual libraries of references, guidance materials and models, and other resources.

e) Develop procedures for rapid field measurement, data analysis and data release during the early stages of emergencies, as well as protocols for how those procedures will be modified to assure greater precision and quality control as needed in later stages of the life-cycle of an environmental disaster.

f) Develop simple streamlined methods to document the basis of decisions made in the course of managing environmental disasters.

g) Conduct performance audits of event responses by EPA staff at the local, state, regional and national level.

h) Finally, to better ground its work on communications in modern behavioral social science, the SAB recommends that the EPA reinvigorate its program in behavioral social science research and application, perhaps by reestablishing the very successful collaboration it once had with NSF-DRMS. This should include: i) a strong program in empirically based methods of risk communication, and development, demonstration and evaluation of mechanisms for better including public values and preferences in post-disaster clean-up decisions.

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APPENDIX A

Tables, Figures, and Illustrations

Box 1: Summary of EPA's authorizations and responsibilities with respect to environmental disasters.

EPA has over 30 years experience in responding to releases of oil and hazardous materials under the National Contingency Plan (NCP) that was established and/or modified by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Clean Water Act (CWA), and the Oil Pollution Act of 1990. Most of these responses do not rise to the level of Incidents of National Significance that are the focus of the National Response Framework (NRF) and the National Incident Management System (NIMS) which are required by various Homeland Security Presidential Directives (HSPDs). Typically, EPA receives over 30,000 release notifications per year (hazardous materials account for about 66% of the total notifications and oil spills for about 34%). Under this program EPA conducts 300 responses per year and assists in about 500 others. Specific EPA responses are to: i) environmental emergencies, ii) acutely hazardous sites/inland oil spills, iii) nationally-declared disasters, iv) terrorist incidents, and v) major national security events. Response activities include, but are not limited to: i) sampling and monitoring, ii) site screening, iii) decontamination, iv) disposal, v) dust mitigation, and vi) data management.

Under EPA's national approach to responses to Incidents of National Significance, the system that the Agency uses to respond to oil and hazardous material releases, under the NCP are integrated into the NRP and NIMS structure and are used when EPA responds within that structure as a part of the total national response to such incidents.

The National Response Framework provides a comprehensive and coordinated structure to prepare for and respond to all Incidents of National Significance. The NRP, coupled with the nationwide response template of the NIMS provides the response structure and mechanisms that enable government and nongovernmental agencies and organizations to provide an all-hazards approach to emergency response activities. The system established is able to address large-scale events needing national leadership (e.g., the Departments of Homeland Security, Justice, Defense, and Agencies such as EPA) for incident management and smaller events where localized management is more appropriate (e.g., state and local officials and organizations).

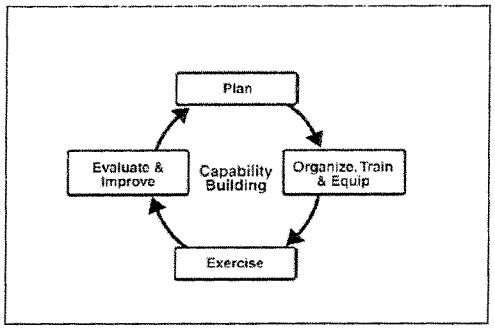

Figure 1: The preparedness cycle as outlined in the January 2008 National Response Framework. EPA has worked hard applying this approach to the aspects of many disasters for which it has primary responsibility.

Table 1: One possible example of a structure that EPA might use to develop a taxonomy of potential environmental disasters.

Natural events	**Events With Humans or their Systems in the Causal Chain**
Biologically related Disease (natural) Invasive species (natural) Geologically related Earthquake Flood plain events Volcanic eruptions Weather related Drought Flood (e.g., Tsunami, storm surge) Lightening Wildfire Wind (e.g., hurricane, tornado)	Complex network system failures Dam, levee, dike failures Disruption of network infrastructures (e.g., power, water, sewer, highways, rail, pipelines, etc.) Large structural collapse Nuclear events Human induced (unintentional and intentional) Biological Chemical release Explosions Fire Invasive species Radiological Water, air, food contamination

Note: While many of the items listed here involve precipitating events that happen suddenly, for completeness any such taxonomy should also include events that develop more gradually (e.g. droughts, invasive species) whose consequences are never-the-less disastrous. When more than one disturbance occurs, the response may be more extreme than would occur when these disturbances occur singly. (Paine et al., 1998)

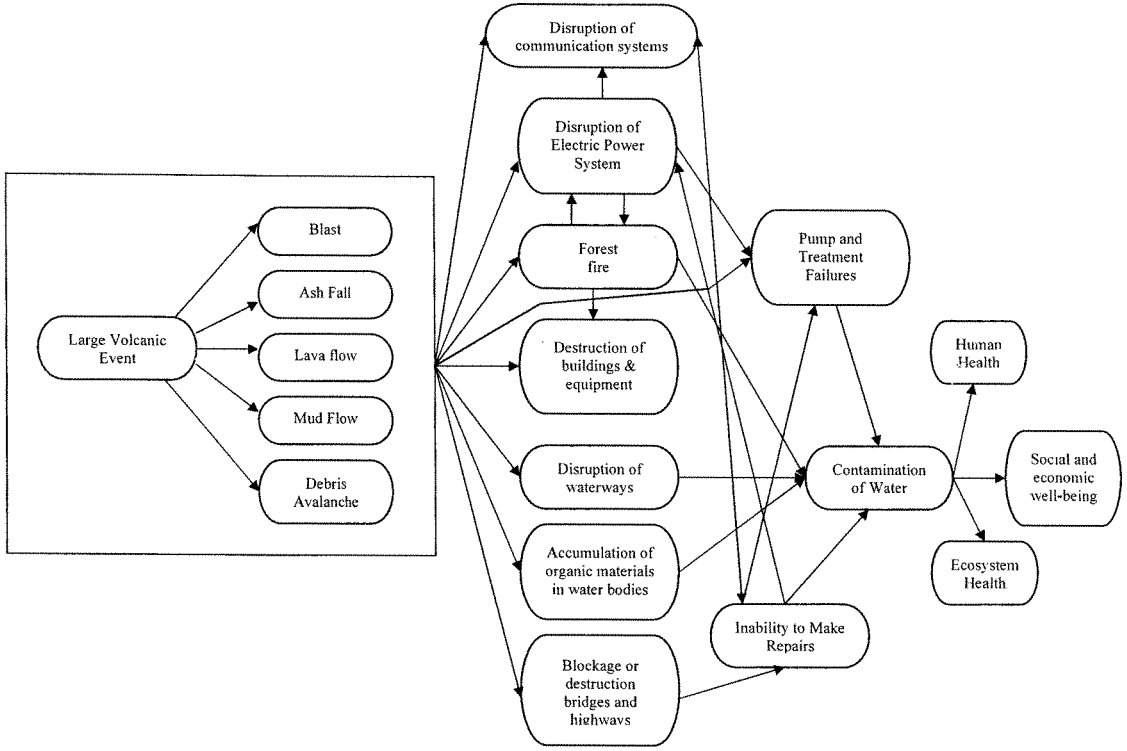

Figure 2: Simplified illustration of an influence diagram tracing some of the routes by which a volcanic event might result in sustained contamination of water supply

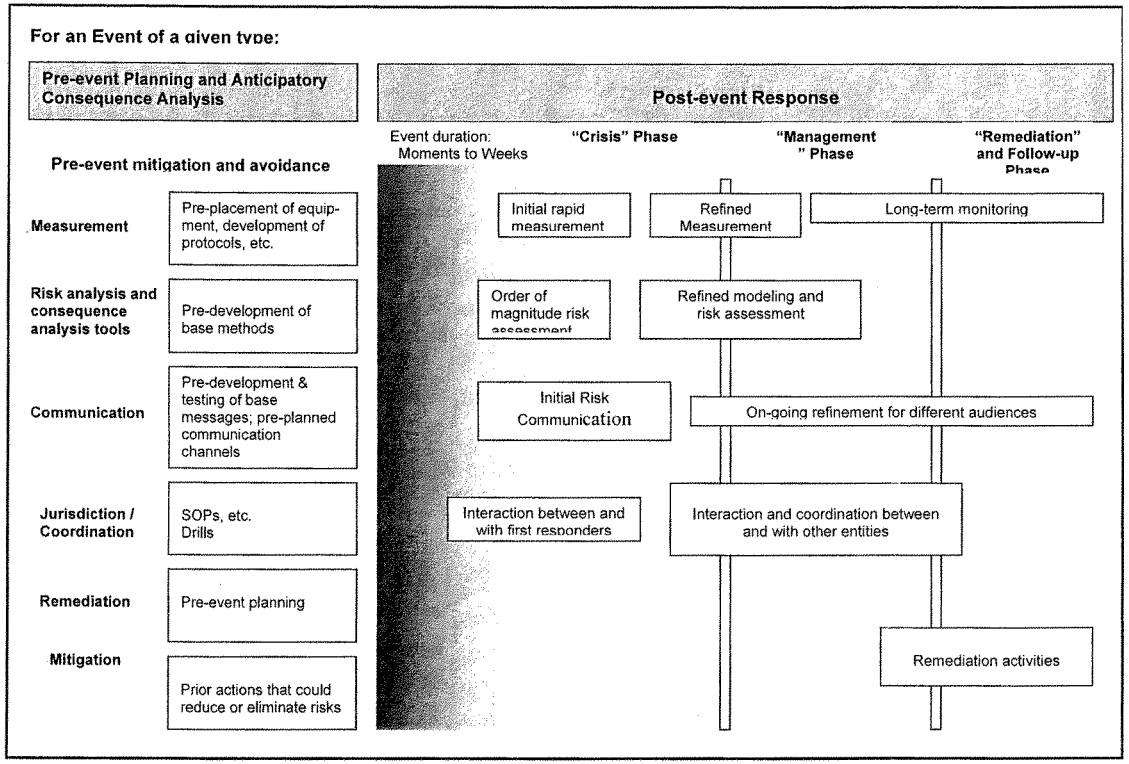

Figure 3. Pre- and post-event tasks for an environmental disaster. Many of the actions noted sh9ould be performed at the regional level.

APPENDIX B

Disaster Prevention and Management Experts Presenting Information to the SAB

Name	Organization
Mr. Joseph Becker	The American Red Cross
Mr. Patrick Brady	BNSF Railway
Ms. Debbie Dietrich	EPA Office of Emergency Management
Dr. Baruch Fischhoff	Carnegie Mellon University
Mr. Michael Lunsford	CSX Transportation
Ms. Suzanne Mattei	The Sierra Club
Dr. L.D. McMullen	Des Moines Water Works
Mr. Alan Nelson	Nuclear Energy Institute
Mr. Timothy Overton	Dow Chemical Company
Mr. Timothy Scott	Dow Chemical Company
Dr. Gayle Sugiyama	Lawrence Livermore National Laboratory
Ms. Dana Tulis	EPA Office of Emergency Management
Mr. William Wark	Unites States Chemical Safety and Hazard Investigation Board
Dr. Henry Willis	The Rand Corporation